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BRIEFLY TOLD.

NINTH MEETING, MICHIGAN GAS ASSOCIATION.—The ninth meeting of the Michigan Gas Association was held, according to schedule—that is, according to schedule, slightly varied by the trident-controlling deity, yclept Neptune, and the unfortunate absence of the President, Mr. B. O. Tippy, of Grand Rapids, Mich. The start was made from the dock of the Detroit and Cleveland Lake Lines, Detroit, promptly at 10 A.M., of the 9th inst., and not far from 200 good men and true were shortly importuning Purser Collins and his associates for the keys to the rooms which were to give them shelter during a 4-day trip over "some" of the great lakes—and great these wondrous water bodies are. About the first news to greet us was the unwelcome message that President Tippy would be unable to attend the meeting, owing to an explosion that occurred in the Grand Rapids plant a day or so before. It was bad enough on any account that he were absent, but doubly so from the cause thereof. However, there was Vice-President Ewing, slim, alert and trim as ever, right on deck, ready to bridge the gap. A beautifully clear, fall day gave us grace at starting, and the eager breeze, quite redolent of autumn days at hand, whipped into brisk circulation even the sluggish blood of your representative. The initial route was quite like that of last year—through the Detroit river, past ever beautiful Belle Isle (every lakeman now pronounces this Belle Eel), through Lake St. Clair, of heaving breast, and along the famous flats of St. Clair river, about and over which were even now circling the vanguard of that famous flight of ducks that brings joy to the shooter and provender to the gourmet. How long these flights will last is surely problematical, for out of the wilderness long since, and, growing with the rapidity of the reeds that afforded havens of rest for the feathered wanderers, are the modern, busy commercial hives of St. Clair and Port Huron. And it might be well in passing to note that the first railroad tunnel in the West—possibly in the East as well—is to be found under the St. Clair river, between Port Huron and Sarnia, Ont., giving railbed to the traffic of the Grand Trunk Railroad. Passing all this we entered mysterious Lake Huron, with its great expanse of waterway, totalling a surface of 300 miles by 100 miles. From here our course diverged to the Eastern or Canadian volume of correlated waterway, bearing the title of Georgian Bay. Over these rocking swells—and rocking ones they surely were—with seemingly unbounden way rolled and swelled the undulations of another of those great inland seas which, when first seen, are verily awesome sights, using the word in its loftiest and highest sense. A night of pitching brought dire disaster to many staterooms, and the climax was reached when the good ship "St. Ignace" worked her way around the promontory that marks the connection between the Bay and Parry Sound. The entrance was made at sunrise and shortly after, anchored alongside the staunch docks of the boat company, on either side of the bight head rested cosily the trim settlements of Parry Sound and Parry Harbor. That glorious September morning one could readily be forgiven for indulging in retrospection. The summing up of the latter was this: What would the intrepid English explorer say could he but look over it all, comparing it with what he saw there when he looked upon it many, many decades ago? The hills were there as of yore, but not covered with the towering pines; the waters were there, too, but not giving surface to huge steam vessels, nor to miles of logs, ready to be sliced up by the rapidly revolving toothed wheels of insatiate saw monsters; nor the shriek of the mill-whistle; nor the habitations of men, notable in the collection being two modern hotels; nor the great viaduct of the Grand Trunk Railway, connecting the Parry Mounds, and bringing the great Northwest nearer to Toronto and the States by many miles. However, this sort of thing could be spun out indefinitely. Suffice it to say that it was all-of the wondrous type. By this time, sea legs and appetites had been recovered. Saturday morning was spent in trips to many places, the trippers wisely going in squads. In fact, as the morning was so was the afternoon. Some went fishing, others went canoeing, some went landward, others tried the water. Those who fished did not have very good fortune, and the honors easily went to Leigh Wickham, of St. Louis. Those who tried the landward side, rode and drove—the only "Jim." Lynn regretted very much the absence of his Detroit-Chalmers machine—but solaced himself eventually in watching a harvest of golden grain. The handlubbers also had a shooting match, a 3-cornered affair, in which contest the press team came off victorious. A result not to be wondered at, when one con-

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SMITHSONIAN DEPOSIT.

sidered the accuracy with which Messrs. Smith and Bigelow selected the winning team. Saturday evening's diversion included a still hunt for a badger; but the details of that thrilling hunt can best be told by Mr. Rice. The evening was closed by an impromptu reception to the Mayor, Chief of Police, the Sheriff, etc., of Parry-Sound Harbor, during the continuance of which the Press shooting team were awarded a silver ring for their prowess. Sunday (another glorious day) was spent mainly in threading through many of the channels that divide the wonderful island formation that prevails in the Sound and part of the Bay. They say there are 30,000 of these, and no one denied the accuracy of the count, for they are as numerous as the sands of its shores. In the evening there was a more or less sacred concert, that was thoroughly enjoyed. The times of mal-de-mer were virtually over, and a good nights' rest enabled all to enjoy the glorious run home, over the outgoing route, and beautiful Detroit was reached in the evening at an hour sufficiently early to enable those who journeyed from a distance to board the trains or boats, as the case may be.

The business sessions were commenced at 2:30 P.M. of Friday, with Vice-President Ewing in the Chair. He was well-flanked and admirably supported by Secretary Chamberlain, and their teamwork resulted in a speedy transaction of business, which speed, however, was not of a nature to cause anything to be slighted. The reports disclosed an exceedingly satisfactory condition of affairs, the main item in the report of the Executive Committee being the recommendation for election of 16 active and 29 associate members. President Tippy's address, which was read by Mr. Shacklette, was a carefully thought out message, and its presentation accentuated the regret which all felt over his perforced absence. Other general or routine business was followed by the numbers in the paper list. The first was the current chapter on the "Constants and Variables in the Destructive Distillation of Coal," the joint work of Prof. A. H. White and Mr. B. M. Ferguson—the latter is the holder of the Gas Scholarship in the University. And a likely looking representative he is. The chapters of the paper bore the earmarks of Prof. White's handwork, for it certainly must be from his well-ordered way that the ideas advanced through the studies in the experimental plant of the Universtty were propounded. The Professor is thoroughly in accord with the work, and he surely is the gentleman to advance it. The respective papers, individually, by Mr. H. M. Bixby, on "The Working Organization of a Small Gas Company," and by Mr. Howard L. Olds, on "Public Relations and How to Maintain Them," severally brought forth good discussions, notably the White-Ferguson presentation. The second and concluding session was commenced at 9:30 A.M., of Monday, and the notable routine work was the report of the Scholarship Committee, the items of which showed that as the history thereof lengthened so was its importance strengthened. The reading ended (which was terminated in a rattle of applause), Professor White clearly outlined that which had been and would continue to be the impelling motive of teachers and men. Not a bit of doubt about it: to his clever manner of arranging and to his equally clever way of carrying out the details, must the higher meed of praise be given Professor White. The first paper considered was that by Mr. Ernest F. Lloyd, on "Segregation of Gas and Commercial Accounting," this was read by Mr. Shacklette in the absence of the author; an excellent presentation by Mr. W. S. Blauvelt, of "The Washer-Cooler as a Gas Condenser," an exceedingly well put series of suggestions in the instance of "Consumers' Deposits, Prepayment Meters and Methods of Securing Payment of Gas Accounts," by Mr. R. Schaddelee. Referring to the latter, although the most methodical of men, he has a remarkable knack of saying humorous things, maintaining meanwhile the demeanor of a stoic. The closing number was entitled "New Business Methods Practical for a Small Plant," by Mr. J. A. Sloan. This ended the technical side of the convention. In the election for officers these choices were made:

President.—Mr. A. P. Ewing, Detroit.
Vice-President.—Mr. F. W. Blowers, Kalamazoo.
Secretary-Treasurer.—Mr. Glenn R. Chamberlain, Grand Rapids.

Respecting the next place of meeting, Mr. Blauvelt (from the committee of 3 to name it) handed in one "majority" and two "minority" reports. The "majority" had the votes, so Battle Creek was selected. Next came the usual votes of thanks, and adjournment, and the Ninth Session of the Michigan was at an end. While we acknowledge the receipt of many attentions from the officers, the rank-and-file, and other guests of the Association, we especially wish to acknowledge courtesies from Mr. Collins, of the "St. Ignace;" from Mr. Bradwin, Editor of the Parry-Sound *Herald;* from Mr. Smith, of the *Gas Journal*, of Canada; Mr. Willard B. Osborne, of the Riter-Conley Company, Mr. James T. Lynn and Mr. John F. Hogan, Editor of *The Gateway.*

CURRENT MENTION—

In the article by Mr. Wm. M. Papst, on "Further Experiences at Portland, Ore.," as printed in the JOURNAL for August 22d, this sentence occurs: "This shows an average cost of reheating gas for the year, including material and labor, of 0.075." In reality, however, the figures should have been, and are, .0075; otherwise ¾ of a cent. The misplacing of the decimal point was the cause of such a vital error.

MR. I. W. PEFFLY, Eastern Sales Agent for George M. Clark & Company, Division of the American Stove Company, informs us that Mr. Walter K. Stafford has been engaged to represent the Company as its travelling salesman in the New England territory. In naming him the Company certainly made an excellent selection.

"MR. ED. J. SULLIVAN, of the Sullivan Brothers, Flushing, N. Y., has just returned from an outing in the Adirondacks, the pleasantest times of which stay were passed as the guest of Mr. W. F. Lawrence, of the Astoria (N. Y.) Gas Company. It is not recorded just yet how many antlered monarchs they located; but later on, or when the leaves have finished falling, and when the game laws shall permit, then will we know how accurate were their locatings. Possibly, when the real shooting time arrives, they will prevail upon that studious hunter, Mr. Thomas F. Holden, of Washington. D. C., for the benefit of his great experience, gained in hills and dells of the Virginias. Meanwhile, we fear that, if we are obliged to wait for a venison steak, the identity of which might be traced to the prowess of these near woodsmen, all days will seem like Fridays.—C."

THE members of the Wilmington (Del.) Gas Study Club gave the initial meeting of the season in the assembly room of the Company's office building some evenings ago. The affair was heartily enjoyed by those who shared in its numbers. Speeches were made by Mr. C. Willing Hare, of Philadelphia, and by Mr. J. D. Shattuck, of Chester, Pa., along technical lines, and other speakers spoke wittily and well along other lines. A banquet was given the Club by Mr. H. S. Schutt, General Manager of the Company, and the toastmaster was Mr. M. E. Hooper, the New Business Manager thereof. At appropriate intervals excellent musical numbers were performed by the Windsor Quartette, composed altogether of Club numbers. About 100 were present.

AN explosion of gas that occurred in the purifying division of the plant of the Grand Rapids (Mich.) Gas Light Company, the morning of Wednesday, the 7th inst., unfortunately resulted in injuries to several workmen. The loss, from a monetary point of view, was comparatively slight.

THE Cities Service Company, of New York City, has filed articles in Dover, Del., incorporating it with a capital of $50,000,000. The incorporators are returned as Messrs. A. P. Anderson, J. M. Satterfield and A. B. Magee, and the stated objects are: "To operate works, plants, etc., for the generation and purification of natural and artificial gas," etc. This Company's ultimate purpose is likely the taking over, under certain conditions, of the plants operated by the Doherty syndicate.

THE Pennsgrove (N. J.) Gas Company has been granted permission to extend it main system to and through Upper Penn's Neck township, under a 50-year grant from the authorities.

MR. EDMUND CATHELS, of Providence, R. I., has been appointed Superintendent of the Marlboro-Hudson (Mass.) Gas Company, vice Mr. John E. Glennon, resigned.

WE sincerely regret to have to chronicle the death of Mr. William McDonald, Superintendent of distribution, West Chestnut street station, of the home works of the United Gas Improvement Company, Philadelphia. He passed away at his home, 5252 Walnut street, the morning of the 12th inst., and the funeral services were had there, with full Masonic ceremonies, the afternoon of the 14th inst.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 10 cents.

969,021. Gas Burner. W. R. Wulfeck, Cincinnati, O.
969,059. Combined Gas and Electric Light Fixture. F. I. Hollingsworth, Denver, Col.
969,085. Gas Generating Apparatus. A. D. Brasson and A. A. Yankee, San Francisco, Cal.
969,182. Automatic Apparatus for Lighting and Extinguishing Gas Lamps. N. S. McNab, Caulfield, and J. S. Link, Melbourne, Victoria, Australia.
969,273. Gas Producer. G. J. Hagan, Pittsburgh, Pa.
969,375. Gas Producer. E. Jones, P. Barr, England, assignor to Kynoch, Limited, Birmingham, England.
969,411. Water Gas Apparatus. R. M. Searle, Mount Vernon, N. Y.
969,502. Gas Apparatus. J. H. Taussig, Philadelphia, Pa., assignor to the United Gas Improvement Company, same place.
969,558. Gas Range Attachment. M. P. O'Donohoe and C. P. Ellis, Nashville, Tenn.
969,630. Gas Mantle Support. G. H. Huston, Cincinnati, O.
969,733. Mamufacture of Gas from Garbage. R. Thomas, San Francisco, Cal.

The Washer-Cooler as a Gas Condenser.

[Prepared by Mr. Warren S. Blauvelt, for the Nineteenth Meeting, Michigan Gas Association.]

Three years ago Mr. William Seymour presented to this Association an interesting and instructive paper, entitled "A New Method of Condensing and Scrubbing," in which he described the Doherty Washer-Cooler, installed at Grand Rapids, and gave records of its performance. It is the purpose of this paper to note some further developments in the type of apparatus described by Mr. Seymour, giving a description of the washer-coolers installed as coal gas condensers by the Solvay Process Company at the Detroit coke oven plant, and the results from their operation.

The gas condensing apparatus in use at this plant, prior to 1909, consisted of 16 tubular condensers, each 8 feet in diameter, and containing 187 tubes, 4 inches in diameter and 18 feet long. The total tube cooling surface with these condensers was 56,400 square feet. The ground area required for the condensers and their connections approximated 1,800 square feet.

The cooling waters available at this plant come from two sources. River water in unlimited quantity may be had for the cost of pumping. In extremely hot weather, however, its temperature occasionally rises to 80° F., and during 2 months in summer is seldom below 72° F. About 150 gallons per minute of well water at 60° F. are also available for gas condensation. With these supplies of cooling water the old condensers were doing their utmost in midsummer, when cooling daily 9 million cubic feet of gas, direct from the hydraulic mains, to about 80° F.

When the decision was made to increase the capacity of the plant to 1,350 tons of coal coked daily, reaching this figure in September, 1910, it was evident that the capacity of the gas condensing plant would have to be increased about 50 per cent. To have secured this additional capacity with tubular condensers would have required ground area in excess of that available, and would have involved a heavy investment in condensers and piping. The results obtained with an experimental Doherty washer-cooler, similar to the one described in Mr. Seymour's paper, had been so satisfactory that it was decided to secure the required condenser capacity by replacing the tubular condensers with washer-coolers. In order to keep down the cost, it was determined to use the old condenser shells for the new apparatus.

At this plant the gas coming from the ovens during the first part of the coking period is kept separate from that coming off later, thus requiring independent condensing and scrubbing systems for the rich and lean gases. Although, from purely theoretical considerations, condensing in four or more stages is preferable, it was decided to do all the cooling in each system in two stages, thus greatly simplifying the plant and correspondingly reducing its cost. Four washer-cooler condensers were, therefore, installed, a primary and a secondary being supplied for both rich and lean gas systems. As the two condensing systems are exactly alike, one description will suffice for both.

The general arrangement of the condensing apparatus is shown in the diagram, Fig. 1. The gas comes from the hydraulic mains,

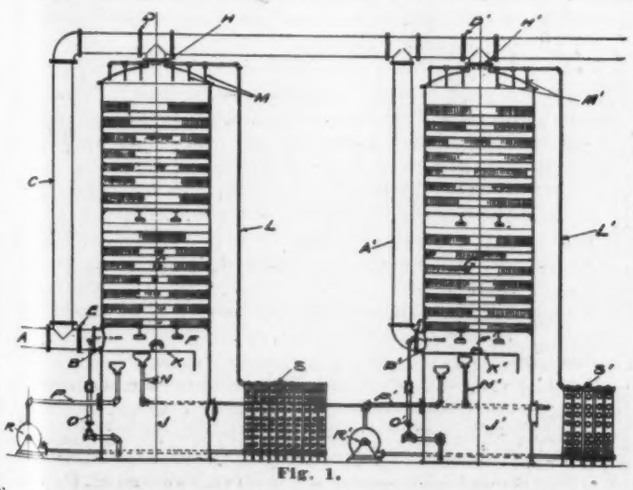


Fig. 1.

through the foul main A, to the primary washer-cooler, which it enters at the nozzle B. A by-pass C is provided which may be used by withdrawing a slip blank at D and inserting slip blanks at E and H. The gas enters the gas space F, passing up through the narrow gas passages between the boards or slats which comprise the grids G (shown in detail in Fig. 2), where it is cooled and scrubbed by direct

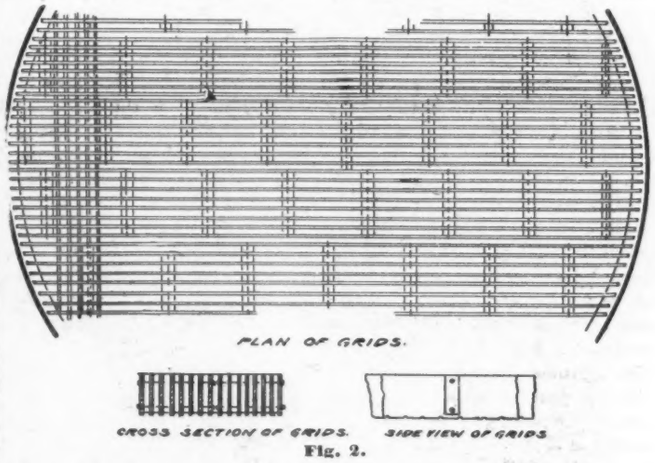


Fig. 2.

contact with weak ammonia liquor which flows down over the surface of the grids. The gas leaves the primary cooler at the top nozzle H, and is conducted through the main A^1 to the secondary cooler, through which it passes in the same way.

At the bottom of the cooler is a liquor reservoir, J^1. This serves as a storage tank for the circulating liquor and as a decanter for separating the tar which is drawn off through the pipe O which extends to the bottom of the reservoir. As the quantity of liquor is constantly increased by condensation of vapor, a constant level overflow N is provided through which liquor, equal in volume to the condensate, flows continuously to the liquor reservoir in the secondary cooler. K is a baffle over which the liquor dropping from the grids flows to the side of the reservoir opposise the tar and liquor outlet pipes. The circulating liquor is drawn off through the suction pipe P, to the centrifugal pump R, which delivers it to the cooling coils S, whence it flows through the pipe L to the distributing pipes M, which enter the top of the cooler and discharge the cooled liquor over the grids through suitable sprinkling nozzles. The circulation of liquor in the secondary washer-cooler is similar to that in the primary. As the heat transferred, however, is much less, a lower rate of flow and less cooling capacity are required. Through the constant level overflow N^1 in the secondary cooler a quantity of liquor, equal to that condensed plus that fed to the apparatus from the primary cooler, flows to a weak liquor collecting tank.

Two types of cooler (single pipe and double pipe) are used to cool the circulating liquor. These are clearly shown in Fig. 3. The single-pipe coolers are stacks of 2-inch galvanized iron pipe, 11 pipes high. The hot liquor enters the bottom pipe, through which it flows, then through a return bend to the pipe above, etc., through the stack. Cooling water, properly distributed by a gutter, flows down over the outside surface of the pipes. The double-pipe coolers are made up of stacks of 8 2-inch pipes enclosed in 3-inch pipes; the 2 inch pipes in each stack being connected together in series by return bends. Special fittings are provided which connect in series the annular spaces between the different 2-inch and 3-inch pipes. The hot liquor enters the annular space at the bottom, flows through it, then to the one above, etc. Cooling water flows through the 2-inch pipe in the opposite direction. During the summer cooling water is also used on the outside of the 3-inch pipes, in the same way as in the single pipe coolers. The cooling coils for the secondary circulation are placed directly over the primary cooling coils, thus economizing space and making possible, without extra piping, the use on the primary coils of the cooling water from the secondary coils.

As temperature conditions during condensation are practically the same for both rich and lean gas, only 2 cooling and circulating systems are required for the 4 washer-coolers. A centrifugal pump is provided to maintain the circulation through each system. A third pump is installed in such a manner that it can be used to handle either the primary or secondary circulation.

The washer-coolers have been in continuous service since July, 1909. The only changes made since the original installation were the installation of a high efficiency pump, to take the place of a low efficiency pump on the primary circulation, and the addition of 7 stacks of double-pipe cooler. The addition to the cooling capacity

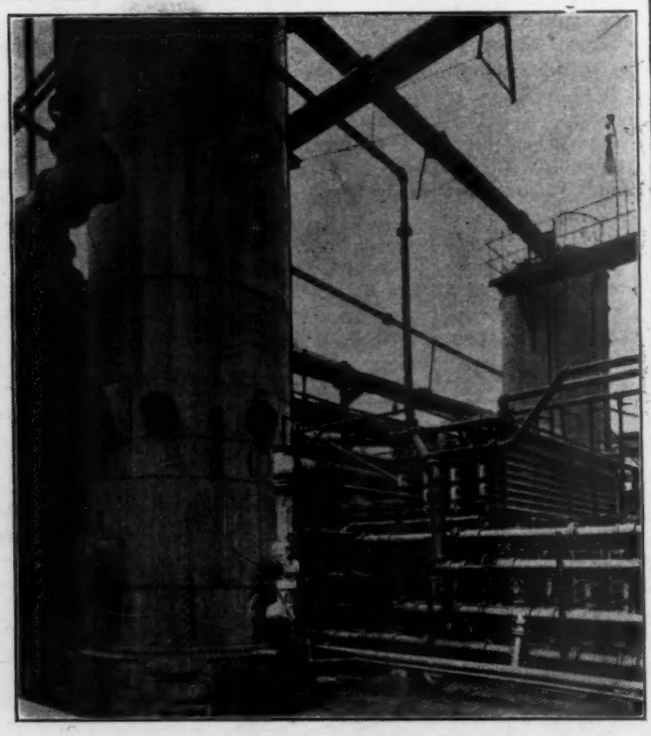


Fig. 3.—The Primary Washer-Coolers and Part of the Cooling Coil.

was made in connection with an enlargement of plant, which increased the quantity of gas to be cooled daily about 2,000,000 cubic feet.

There has been no trouble on account of naphthaline stoppages in the apparatus. As naphthaline can collect in masses only on stationary surfaces, there can be no trouble from this source in an apparatus where all the surfaces are at all times covered with flowing liquor, which immediately carries away any particles of naphthaline which condense. There is a slight accumulation of naphthaline on the walls of the cooling pipes through which the ammonia liquor circulates. This is very quickly removed by steaming out the coil. In order to maintain the cooling efficiency of the pipe coils, it has been found advisable to steam them out at interva's of about 3 months.

So far as observed, the rapid cooling has had no ill effect upon the illuminating power of the gas. Loss of candle power in condensation is due to the absorption of illuminants by tar. Such losses increase if the tar, after condensation, is allowed to remain in contact with the gas, and especially if the temperature of the tar, after condensation, is reduced before it is separated from the gas. In the washer-cooler the tar after condensation flows down through the apparatus. As it descends with the liquor its temperature is constantly raised and its power to absorb illuminants is greatly reduced. It is somewhat of a question also whether the tar, after condensation, ever comes in contact with the gas. It is probable that each particle of tar is covered with water immediately after it has condensed.

Temperature observations made July 21, 1910, are given below:

Kind of Gas.....	Rich Gas.		Lean Gas	
Washer-Cooler.....	Primary	Secondary.	Primary.	Secondary.
Temperature of gas entering...	180° F.	127° F.	180.5° F.	124.0° F.
" " leaving....	127° F.	85° F.	124.0° F.	85.5° F.
" of liquor entering.	119° F.	85° F.	119.0° F.	85.0° F.
" " leaving..	169° F.	101° F.	162.0° F.	100.0° F.

The results of this substitution of washer-coolers for tubular condensers have been very satisfactory. The total condensing capacity has been increased 50 per cent. while the ground area occupied by the condensing plant, including the pumping station, has been reduced 25 per cent. The cooling surface in the new installation per unit of condensation is less than $\frac{1}{3}$ that provided in the old tubular condensers. The labor of cleaning the apparatus has been reduced, and naphthaline stoppages have ceased. The effective scrubbing during condensation removes practically all the condensate as soon as produced, thus delivering a much cleaner gas to the ammonia scrubbers than was obtained from the tubular condensers.

Public Relations: How Best to Create and Maintain Public Goodwill.

[Prepared for the Nineteenth Meeting, Michigan Gas Association, by MR. HOWARD L. OLDS.]

Much has been written upon this subject lately by our most able writers, and very little is left to be said that will not be repetition or plagiarism; but the attention that it is receiving shows the march of progress, a wonderful stride in the direction of closer relations between the public and public utilities, and almost all corporations are adjusting themselves to these probing suggestions of the hour.

Public opinion is a fickle jade. From the time of earliest history on down through the centuries, kings, emperors, public men and movements have catered to the people. One moment adulation is theirs; the next they are trampled in the dust. The blowing of a straw, the turning of a hair, the coining of a phrase will sometimes accomplish success or defeat. The public exhibits a curious trait of human nature, and it is very difficult to win and hold its goodwill, more difficult probably to hold than to win it.

Obvious.—That friendly relations with the public and general goodwill are essential features to all those endeavoring to serve and do business with the masses is readily admitted. No argument can be brought in rebuttal, and only failure or indifferent success can result when the proper public relations do not obtain, and failure to recognize the rights and claims of the multitudes has caused the downfall of many institutions. That public goodwill is an overwhelming asset and investment, with a comparatively small outlay of money, is obvious. Be it noted that the public has taken upon itself to be informed as to our service companies and when the public and public service corporations discover themselves to each other better relations will exist.

Committee.—In looking over the proceedings of the gas associations for a number of years past, there appears to be very little on this subject. The Institute (1907–1908) appointed a Committee on Public Relations. This seems to have been the pebble dropped into the smooth water that started the ever-widening circle of interest; and each alert company took up the work of establishing the better mutual feeling with the public. There is in existence to-day a company whose sole business it is to supply materials and ideas in the assistance of establishing and maintaining friendly relations with the public.

Ancient Prejudice.—The old prejudice against public service corporations, that has come rolling down the decades, has been so persistent as to be almost humorous. We are compelled to admit that the corporations themselves are largely to blame, by their lack of cooperation and by generally ignoring the public and by assuming aggressively that they have the whip handle. This feeling has also been intensified by unscrupulous politicians, who, to curry favor with the masses, have seized upon the most flimsy technicalities to abuse the corporation, hoping thereby for self aggrandizement. Throughout this period it has seemed the public liked abuse, vituperation and invective in support of its pet prejudice, and any little excuse was seized upon to feed the popular demand; but to-day we are living in the age of constructive thought. We are children of light, but far from being grown up, and the illuminating rays of the campaign of optimism, now abroad in the land, are going far toward dimming this phantom of the past.

Transition.—A critical point in the life of a company is the time when it emerges from a one-man company, in which the manager is familiar with each department, both at the works and office, in which he knows each consumer personally and can speedily adjust a misunderstanding, and becomes the company necessarily large enough for departments and heads of departments, with the usual amount of red tape to be unwound frequently to the consternation of the consumer. At this point, in walks the complaint man, the genial, human buffer, who conserves the sympathy and real human interest and nearness to the people. Fortunately, the widening of the tent pins of a company, the involving of more human machinery and yards of red tape come on so gradually that these difficulties generally adjust themselves.

Personality of Corporations.—The personality of a corporation is as potent as that of an individual. A great deal depends upon the standing, bearing and particular nature of its representatives. What they do, how they bear themselves in every detail of life, is of weight, because the discussion of its affairs is current and forms public sentiment. Too little attention is paid to the impressions that the lives of owners and active presidents of corporations give out.

As to the treatment and handling of employees, a long, stirring

article might be written on this, and sometimes it might be well for men, who hold superior positions in a company, themselves to attend a college of instruction. Men, either by accident or design, have sometimes attained positions to which they have no more right than babes in arms, and whose gross ignorance has caused the company to lose more than mere money. The courteous and appreciative treatment of good, honest effort on the part of men under them will establish good feeling within the forces themselves. This good feeling within is one of the first requisites for creating goodwill without. The attitude of employees is often but a reflected light of their superiors.

Managers.—A careful study of successful public utility properties and progressive operators will disclose the fact that the enterprise is managed with regard to the comforts and desires of the multitude thus served, and that consumers or patrons are made to feel that their interests are to a degree in common with the corporation, which operates by virtue of an ordinance or franchise granted by those who pay the tribute, keeping the corporation in existence and enabling it to become a power among local industries.

Closer observation will show that the general manager or superintendent is a man possessing a large faculty, commonly interpreted as justice, insisting not only on fair play to his company, but equity to his fellow citizens. He is ready at all times to receive suggestions for better service, and evinces a genuine interest in increased efficiency and improvements in the quality of the product manufactured or distributed by his company, and is ever ready to adjust wrongs and grievances that really exist, taking a firm and courteous stand against wrongs and grievances that do not really exist, but are wholly whims or idiotic complaints from the always-to-be-found kicker. This attitude will invariably win the confidence and respect of the public and, in more than equal ratio, will diminish the number of complaints, as humanity, since the time of the dark ages, is ever ready to frame apologies and excuses, if they are needed, for those in whom they believe.

Assuming always that we are considering only those who know, and know well, the business in which they are engaged, it has been rightly said that, to be a manager of anything, one must either be a dictator or a diplomat. The dictator will succeed in some instances by hoeing a hard row, progress slowly in others, and fail utterly in the general run of cases. The diplomat has success for his door mat, if diplomacy does not degenerate into flattery, or to use the old-time expression, "humbuggery." He does not necessarily need to act on all or any of the ideas suggested by his townspeople, but he can make them feel that their words have been worth while and that some day, perhaps, their ideas will have materialized into realities, like the wise matron who, in reply to the question if she believed everything her husband told her, said, "No; but I make him believe I do." A downright good boss is born, then further made by a keen study of human nature. Any man who has been at the head of bodies of men well knows the difficulty of keeping them in good humor, of maintaining harmony and, still more, to strike their imagination so as to interest them and evoke their enthusiasm in the objects and purposes of the organization, making each and every employee a loyal booster for his company. A manager must so keep his hand on the pulse of the public that he can know whether it is really satisfied or has a feeling that it would do no good to complain. In short, let no company, through its acts, create the condition wherein a man pays his bill with one hand while the other is clenched behind him ready to strike. A manager can surround himself with so much red tape that it will eventually tighten around his neck and choke his real knowledge of the intimate feelings of the public. In short, what this man should do, and what he s ould be, would involve a discussion as wide as human nature itself. Please do not think he is a miracle. There are plenty of our good managers who are in themselves all of these things, and more.

Employees.—This is an age which demands the highest efficiency in all branches of work, and the employment by a company of high-grade and competent office employees and foremen is of first importance. A small school of instruction in courtesy has been established by some, and could be established by every company, as the handling of an irate consumer requires much tact and patience. Not, of course, that these attributes can be indiscriminately handed out in any school, but a little judicious suggestion may often bring them out in an employee, and time is well spent in making a satisfied consumer. Make it an offense of the first degree to be rude or curt to a patron, as extreme courtesy and attention will in time convert even a chronic kicker. In some localities the conduct of the employees has almost the entire forming of the sentiment of the masses. A chain is no stronger than its weakest link, and in forging together your forces, see to it that honor, integrity and the fair, square, deal are melted into one homeogeneous mass and molded into human links in your own chain. No company can thoroughly project the good feeling toward its public if there are groanings, writhings and jealousies within itself. It is like a house divided against itself which cannot stand, and it behooves us to renovate and sweep our own doorsteps of all internal contention.

Obligations and Business Methods.—As said before, a company operates by virtue of an ordinance or franchise, granted by those who pay the tribute which keeps the company in existence. The public needs and wants us. Each is as necessary for one as the other, and it is ours to live up to the letter of the franchise; making or sending out the best product at lowest profitable price, doing good work in or on the streets, impeding traffic as little as possible; protecting lawns from trench work by means of canvas; refilling trenches promptly and thoroughly and protecting shade trees in practical ways. Wear a seraphic smile when you pay your taxes, and if your assessment should be too high, make your objection, but not too strenuously. "Honest worth for honest money," should be a motto with utilities as well as in any other business. It is the practice nowadays with merchants to refund money if goods are not satisfactory, and it is ours to furnish the best commodity possible, for our goods are not returnable.

Show patrons the very best and most economical way of using gas, and how to get the best results with the minimum amount of time, labor and fuel. Demonstrations are often eye-openers to people who have been determined to go along in the same old way. Use a policy of generosity, of full measure, pressed down and running over with courtesy. Have just and fair rules for the allowance of discount for prompt payment of bills, and do not depart from them under any circumstances. Do not make fish of some and flesh of others. Conduct your business in a pleasant, thorough, natural, painstaking and proper way, and good feeling will take care of itself.

Honest Publicity.—In the days of Commodore Vanderbilt the famous expression credited to this worthy gentleman, *i. e.*, "The public be damned," might stand; but to-day our faces are turned toward the rising sun of equity, equality and co-operation. The public is no longer to be damned, and woe to those who insist on this strenuous policy. The masses are thinking, and it is not possible to befog the public mind with half truth, with evasions, with misrepresentations, meager assertions and bluff. Do not put off too long the taking of the public into your confidence; for plain statement of fact and a systematic campaign of straightforward enlightenment make a stride toward the insurance of public goodwill.

Backbone.—There is no need for actual cowardice on the part of the operators or managers, or to allow the public to dominate these policies to such an extent as to retard its successful operation from a financial standpoint. Lines and principles should be carefully laid, and established with regard to fairness and equity to both consumer and corporation, and deviations from such principles should not be hastily made to satisfy the whim of some individual whom it is impossible to please and who may be unduly disgruntled. If a company is really doing all it can in furnishing good supplies at moderate rates, it can hold up its head before any of the "powers that be." Dignity, honesty, courtesy and complete understanding, with a large stock of goodwill, are a great protection against council-manical invasion.

Politics.— ..... ! ! ! ! ! ... ??? .... ! ! ! .... Keep out!

Newspapers.—As has been said millions of times, so powerful is the influence of the press, that some tactful representative of a company should be alert to prevent any misrepresentation before the public; to meet and break the force of any attacks made and to enlist, as far as honesty will admit, the favor of the community. Advertise as much as a direct commercial benefit would justify.

Ideals.—Last, but not least, is the need for higher ideals in all enterprises, no matter what they may be; the desire to give value received and to do that which we would have done unto us; to be fair and just because it is right in itself, eliminating mercenary problems entirely. Too little of this spirit has prevailed in the past, and in disregarding one of the fundamental laws of control, corporations have in the past built up for themselves a wall of distrust. Right will prevail in the lives of corporations, as well as in the lives of individuals.

Order and cleanliness in and around the various plants and neat-

ness in the general appearance of employees set a standard of advancement and are conducive to favorable public attention and general goodwill, and the people served by such a company will point with pride and call attention to the improvement and believe in you and your work. Flowers and shrubbery arranged about your building are a longer step in the right direction than generally accredited to these innocent manifestations of life. These are, many times, an inspiration in the life of a workman to live up to higher ideals and to keep up with an ethical procession that is good for him. Courtesy and gentlemanly conduct and attention to all, child or adult, rich or poor, with equal bearing in dealing with the lowly or the great, are bound to command attention and will do much to win the devotion of wives, widows and daughters, and that in itself is the most important item, for in many cases they are the personages through whom general goodwill is gained or lost.

Not being Shakespeare, we repeat, and say again that public goodwill is an important asset. Cultivate it, cherish it and take it into your hearts. You can make pure gas, produce brilliant electricity and supply wholesome and unturbid water; but if the public is not on your side, your sojourn in a community will be neither profitable nor pleasant.

New Business Methods Practical for a Small Plant.

[Prepared for the Nineteenth Meeting, Michigan Gas Association, by Mr. J. A. Sloan.]

In small towns or cities the success of the gas company depends, to a greater or less degree, on the sentiment of the public toward it. This is governed largely by the company's methods, attitude, or interests with regard to public policy. This interest should always be helpful in the matter of securing new business. To increase gas sales in small towns or cities, we must first give good service to the consumer we already have, as satisfied consumers are the best medium of advertising. One usually finds electrical competition in places of this size, but this serves only as a stimulus to keep the gas man always on the job. The manager should be in touch with all conditions and details of the business. This is not only possible but necessary, in plants of this size, as his assistants are few.

There should be one good, active, energetic, solicitor or new business man, with a thorough practical knowledge of house piping and gas appliances of all kinds, and having at least a fairly good idea of the manufacturing and distribution departments. He must not be afraid to lend a helping hand in any one of these departments, if necessity demands it. He has sufficient jurisdiction over the house piping and appliance department to enable him to know that all agreements, which he makes with the public in regard to installations, are promptly fulfilled. The keynote of success in this new business campaign is co-operation—not only of manager and solicitor, but of every employee of the company. Each and every employee should never lose an opportunity to further the ends of the company's interest; in other words, increase the sales of gas. Any employee who does not talk gas, and really believe in its merits, should be discharged at once. No man can be a strong advocate of a cause in which he has no faith. All employees should be cautioned against criticizing their competitors' goods or methods of doing business. Nothing is gained by this so-called "knocking." When an employee begins it the consumer, or prospective consumer, at once mistrusts either him or the company he represents, and an unfavorable impression is sometimes left which greatly delays the securing of the business.

The manager formulates a plan for his solicitor, taking up different branches of the work at different seasons of the year. A thorough house-to-house canvass should be made twice a year, making sure that all appliances already installed are giving perfect satisfaction, selling what appliances can be sold, and noting the prospects of every nature preliminary to an active new business campaign. These prospects should be filed on cards, in geographical order, for the future reference of manager and solicitor, who follows them up with correspondence and personal solicitation. Special attention should be paid at all times to prospective consumers on old mains and to selling additional appliances to present consumers, as this new business is gotten without expense to the company, except for meters. Frequent conferences of manager and solicitor are necessary to determine methods to be employed, policies to be pursued, ways of introducing appliances, and ways-and-means of satisfying the consumers and retaining them.

The solicitor must be able to advance a clear, forceful argument for his goods and should meet every *one* objection to the use of gas with *three* good reasons why his prospective consumer should use it. Another feature of the solicitor's work is to keep closely in touch with architects and builders, so that he may learn of the preparations of plans and specifications of any buildings or homes before the work is begun, and thus enable him to eliminate, so far as possible, any wiring, and to see that it is properly piped for gas throughout; and if it is to be a dwelling, to work for a modern kitchen, which bars the coal range, and assures to him the sale of a gas range and water heater.

The office, store or showroom plays an important part in the securing of the business. It should always be neat and well kept, with its windows clean and the window display rearranged at least twice a week. While the company need not carry a large stock, it should have a complete line of high-grade fuel appliances, fixtures and lamps, frequently rearranged, to impress the consumers when they visit the office with the fact that a large amount of business is being transacted all the time, and large quantities of goods being sold. These appliances should be sold and installed at a profit sufficient at least to cover all expenses in connection with the new business department, and to enable the company to employ men for this work who will make installations in the most satisfactory manner, thus greatly assisting the solicitor in securing new business. The fitters must be courteous and tactful and aim to please and satisfy the consumer to such an extent that the work and service will prove a lasting advertisement for the company. It is not deemed advisable to spend much money on newspaper advertising, but a reasonable amount can be profitably spent at certain seasons of the year. It is far more profitable, and will bring better results, to spend the money in taking care of present consumers, keeping up the showroom in a first-class manner, and keeping your solicitor constantly and persistently after business.

Requiring consumers to come to the office to pay their bills, instead of delivering the bills to their houses, has been successfully tried and proven a very important factor to the new business department. This method eliminates the expense of delivering bills and is the ideal way of handling collections. It also brings the consumers in direct contact with the company and enables them to become better acquainted. Then, too, all grievances may be settled in a satisfactory manner. The company knows just when to expect the consumers at the office and takes advantage of this by being prepared to demonstrate and interest them in the different appliances and supplies. This is usually the best time to interest them, because their attentions are already directed toward gas. It is essential that the bookkeeper or cashier, who has charge of the office in the absence of the manager, and who usually attends to the cash window, should be pleasant and obliging and listen courteously to all complaints and make an accurate and complete record of the same. This bookkeeper should also have sufficient knowledge of appliances and supplies and their prices to enable him to discuss intelligently their merits and make a sale whenever it is possible. Many a good consumer has been lost through discourteous treatment received at the office and many prospects overlooked. The manager and solicitor are at the office during the busiest discount days and busy evenings. During this time the solicitor closes many of his old prospects and finds new ones.

The soliciting of the business places, for both lighting and industrial appliances, should be under the direct supervision of the manager. Do not give anything away. Charges for installation in business places should cover at least the actual cost; then the business man or consumer does not feel that he is being bribed to use gas, but he knows the value of the goods and feels that he must use them in order to make it a profitable investment. The secret of making the business lighting a success is to so arrange the fixtures that the business place will be better lighted at the lowest possible cost. The gas company needs the lighting of the business places, not only for the revenue, but the fact of its having a large per cent. of the business lighting proves a forceful advertisement and furnishes a good argument when canvassing residences. In small towns the price of gas often hinders the securing of industrial business, but there is always a certain amount which can be gotten to the advantage of the consumer. The manager must be certain that the company has all the business of this kind that it is possible to get.

The amount of new business secured in any town, and the increase of gas sales, depends to a great extent upon the methods employed and practices followed, but it is absolutely necessary that manager and solicitor work unceasingly and energetically. This being true, and every employee co-operating with them, the results should be of a most gratifying nature.

Consumers' Deposits, Prepayment Meters and Methods of Securing Payment of Gas Accounts.

[Prepared for the Nineteenth Meeting, Michigan Gas Association, by MR. RICHARD SCHADDELEE.]

The title of the pap r that our honorable executive committee has requested me to write is certainly of imposing length and comprehensive in nature; so you are warned beforehand that the limitations of this paper will allow me to touch only the "high spots" of the subject. We manufacture, we distribute, we sell gas; finally, we collect the money for it, but not always.

The last process, that of extracting from a not-unsophisticated and not-unsuspecting public, good legal tender or its equivalent in payment of the amount of our comfort-bringing and money-saving product they have used, is by no means the incidental and non-important function of our business that the lack of papers, and discussions on same, at the various cenventions of the members of our profession, would lead one to believe it is.

As your executive committee, judging from the modest title adorning this paper, evidently expected me to produce a sample of three for one, permit me to divide my rambling observations into three sections, properly labelled.

Consumers' Deposits.—The policy of requiring consumers' deposits, to secure the payment of gas furnished, is an almost universal practice among gas companies. If properly exercised, it is not only a good policy for the company, but one that is entirely tenable as between the company and its consumers.

In my opinion, the axiom, "That it is better not to sell your product, than to sell it and not to get your money for it," is a sound and safe principle in the conduct of our business, or of any other business. In the conduct of our business we have to take a certain risk—that of not being able to collect the selling price for our product. This is true to a greater or lesser degree of any business, except street car companies. The nature of our business makes it impossible to establish same on a cash basis, except by the exclusive using of prepayment meters, and even if this extreme should be resorted to the risk is by no means eliminated. If the policy of setting prepayment meters is not favored, then the risk of bad debts can be reduced by the requirement of a deposit, or the guarantee of a responsible second party. An indiscriminate and blindfold enforcement of deposits or guarantees has an inflammatory effect on the public and depreciates the company's goodwill assets. Whoever passes on applications should be tactful and thoroughly competent to act as credit man for the company. A good credit man is more essential and valuable to a public utility company than to a mercantile establishment, and I feel sorry for the gas company that has no competent credit man to act on applications for gas.

The company should carefully compile and maintain a credit record of its own, made up from past experience, and this is best compiled and maintained by the collection department. Assuming a good credit man to pass on application, either a deposit or a guarantee should be exacted from two classes of applicants for gas, viz.:

1. Applicants who are unknown to the credit man and to other responsible and available employees of the company.

2. Applicants who have the reputation and record of being poor pay or dead-beats.

As a rule the larger the number of consumers and the larger the city, the more necessary it is to be careful when furnishing gas without either a deposit or a guarantee. A good, tactful credit man can make the planking down of a cash deposit by a prospective consumer, if not a performance of unalloyed bliss, at least an action not too severely painful, and such a *clerk*, believe me, is a valuable employee, not to be lightly discarded.

The amount of gas the applicant is likely to consume per month should be estimated as nearly as possible by questioning the applicant, and a deposit sufficient to cover at least twice that amount of gas should be required. This is imperative, as our consumers usually owe at least 1½ months' gas before the last discount day, and if a consumer fails to pay on that day and has to pay the discount, he usually owes for nearly 2 months' gas by the time the persistent collectors succeed in getting the delinquent bill paid, whether by moral persuasion, dogged persistency, or by the persuasive powers of a grimy gasfitter, armed with the always-handy Stillson wrench.

A consumer is also apt to be out-of-town and to owe for more gas than intended by the company. Every month an inspection should be made of each consumer's account, to compare gas bills with deposits, and consumers whose deposits are too small in proportion to their monthly bills, should be tactfully and courteously requested to increase their deposit. I advise you to do this through the medium of a gentlemanly, urbane employee rather than by means of a cold type request. You are not so apt to ruffle the temper of your valuable consumers and will in many cases avoid the disturbance of your own peace of mind.

Before requiring such an increase of deposit, careful inquiry should be made as to whether the consumer, since he made his first deposit, has established a reputation of honesty and good credit with the company. If so, do not require an increase of deposit. Take your chances on him. Some companies establish a more or less fixed set of rules governing deposits, usually requesting no deposit of applicants who own, or at least profess to own, the property where they desire to have the gas supplied. This I do not consider either a safe or reasonable rule to be adhered to rigidly. It is better to take your chances with an honest man who rents, than with a dishonest one who owns his property.

Rigid rules or requirements in regard to deposits are productive of a good deal of ill feeling among our consumers, which feeling will manifest itself at unexpected times. The best policy is to exercise great caution in this direction, and use good common sense and intelligence in dealing with this question, taking in consideration your local conditions, the class of people with whom you are dealing, and the feeling existing among the public towards your company. With a fair class of population, you can run a gas company in a small town, asking no deposits or guarantees of anyone, and still keep your bad debt losses down to remarkably low figures. A very small number of prepayment meters, and a close and constant check on your gas accounts receivable, coupled with intelligent handling of your consumers in all your dealings with them, will produce such results. And again, believe me, you will deserve far greater commendation and will be more valuable to your stockholders if you keep your bad debts down by the methods just mentioned, than if you produce such results by arbitrary and indiscriminating demands for deposits and guarantees, and the reckless flourishing of your monkey wrench in the faces of your arrears' customers. A policeman who can keep order in a crowd without the use of his club is a far better and more efficient guardian of the peace than the one who keeps order only by the indiscriminate use of his club or other implement of war. Remember, too, that you take far greater chances when using your clubs than policemen do when using theirs. We have our clubs but should use them with great reluctance and caution, and only on the severest provocation. If you cannot keep order except by excessive use of your clubs, you would better do some introspection, and find out whether you are on the right beat, before you blame the crowd you are dealing with.

If a consumer makes a deposit, a proper receipt should be given him, and proper records of same kept in the office. The card record is the best for deposit records, and the deposits remaining in the hands of the company at the end of each mouth should be listed. After verifying each list with the controlling account in the ledger, the list should be filed away in a proper place. The listing of the deposits each month will enable you to easily trace any mistake that may be made the month it occurs. Deposit receipts should be numbered in a book with proper stubs, and issued numerically. Before a deposit is refunded, be sure the consumer owes you no bills. If he does, deduct them from the amount of the deposit. It is better to find out whether he owes you bills before you refund the deposit, than after you have refunded same. That is, it is better for your company, and more in accordance with gas etiquette. A fair rate of interest should be paid on all deposits, whether receipts are lost or not. With some companies the question as to whether interest is paid on deposits is governed entirely by the timidity or bashfulness of the depositor. The depositor who demands the interest receives it. The depositor who does not demand it, receives it—*not*. Happily such gas companies are very rare. I am ashamed that there are any. I hold in low esteem the man, and in less esteem, the public service corporation, that is honest only when directly requested to be so.

Prepayment Meters.—Prepayment meters are so well known at the present time that a description of them is unnecessary. A prepayment meter should register gas accurately, and should deliver the correct quantity of gas for the money deposited. It is desirable that the quantity of gas to be delivered for a quarter should be easily changeable by your fitter with no, or very small, expense. It should be easy to increase the quantity to be delivered for a quarter. It is not necessary that you should be able to decrease the quantity, as gas rates always go down and never up. The more difficult it is to

extract the money without the formality of using a key, the better for the company. Still it is difficult to make a prepay meter proof against a burglar's kit or the impact of sledge hammers. It is advisable to use one type of lock, and that of the best. Have only as many keys as are necessary, and always know that the keys are in proper hands. Read the meters regularly, one man doing the reading and another one collecting the cash the next day. Be very careful as to the integrity of the man who reads the prepays and collects the money, and be careful about the keys. This will assist wonderfully in balancing the cash with the gas used. If you have prepayment meters that cannot be set to deliver exactly the amount of gas for a quarter that your gas rate entitles the consumer to, so much the better. Set it at the nearest higher rate.

I strongly advise you to keep a separate account with each prepay ment meter in use, showing each month the reading, gas consumption, net amount of bill as per your regular rates, money actually collected, and balance due to either the consumer or the company. If at any time an individual account shows a balance due the company, it should be immediately investigated until the cause is discovered. When a consumer quits using gas or has a regular meter set in place of the prepay, this account, if kept as above outlined, will show whether you owe him or he owes you. If you owe him, you will have no trouble in settling with him. If he owes you, the matter is more complicated, and you may have some trouble. When a prepay meter is to be set, a regular prepay application should be signed. This application should contain, besides the clauses of the regular application, clauses whereby the applicant agrees to hold the company harmless from damage to the meter, and from damage on account of the insertion in his meter of anything else except perfect U. S. 25-cent pieces. He should also agree to pay to the company on demand any discrepancy between the money collected and the price of the gas registered, as figured at the regular rates. It is well to explain his responsibility in these directions very fully and carefully to each applicant who applies for a prepayment meter. The introduction of a few prepay meters will create an insistent and fast growing demand for same, and if they are set upon request, you will find that you will soon have a surplus of regular meters not in use.

Unless you are an enthusiast in favor of them, you had better be very careful not to encourage their use. My observation and experience are that prepay meters as a rule reduce the sales per meter. It is true that, where only a small percentage of the meters are prepays, the consumption per meter is usually larger for the small percentage of prepays than for the much larger percentage of regular meters. This is undoubtedly due to the fact that such companies use the prepays largely for transients and unstable consumers in the business district, who are large users of gas and who are unwilling or unable to make the large cash deposit that would be necessary to properly protect the company.

Personally, I consider the prepayment meters very useful for certain purposes, but with most gas companies their uses are limited, and I do not recommend their extensive employment. They have their advantages and disadvantages. They are apt to be a source of danger, although I consider this usually over-estimated. They produce plenty of work for the complaint man, and the gas company depends largely upon the honesty of the collector as to whether it receives pay for the gas used. A dishonest collector can get away with a lot of money and it is well-nigh impossible to get conclusive proof of his dishonesty. If discrepancies occur between the price of the gas used and money collected, this may be due to a dishonest collector and the company may innocently get into a hot wrangle with the consumer if it tries to collect the discrepancy from him.

There are certain people that you cannot get to consume gas, except by means of a prepayment meter; but they are few in number. For such people and for deadbeats and transients, the prepayment meter is valuable to the gas company. But it has not come to my knowledge that in this country, at least companies who are using prepayment meters extensively or exclusively, are showing any remarkable sales per meter or per capita, compared with up-to-date companies who are conservative in the use of prepays.

Nor has it come to my notice that the bad debt losses of such companies are lower than with well managed companies who do not use them. It is also a very important fact that the first cost, and subsequent maintenance of prepays, is much larger than in the case of regular meters. They undoubtedly reduce the complaints of high gas bills, but I have found that consumers with prepays also make work for the complaint clerk. It is quite common to receive a report of poor gas or no gas, and on sending out a man at breakneck speed to find a prepayment meter that needs a quarter as a lubricant. Be very careful to use great circumspection, however, in stating your diagnosis to the consumer, as he will immediately inform you that he put in 4 quarters yesterday and has hardly used any gas. The fact that you open the money box and show him that there is only one solitary, lonesome beer check occupying the inner recesses of this depository of the gas company, is no convincing argument for him. He put in 4 quarters yesterday and it is none of his business where they have gone. The prepayment meter is only another instrument invented by the grasping gas monopoly to reap where it sows not. Having gotten you to this critical position in your friendly argument with your prepayment consumer, I regret that I have not the space to stay with you and report your final arbitration with him.

To the gas manager who is interested in numismatics the prepay meter is also useful. It often collects, in a spasmodic manner it is true, but still it collects, various coins that are rarely met with in the regular channels of trade. Although designed to receive only United States 25 cent pieces of first-class quality, prepayment meters are apt to bring forth 2-cent pieces, 20-cent pieces, beer checks, cigar checks, pennies, dimes, lead disks, paper wads, counterfeit Canadian quarters, Hawaiian quarters and other curios of widely divergent nature. Oftentimes an absentminded consumer will deposit a quarter in the meter, and afterwards feel sorry he did not spend it for beer, cigars or other necessities of life. Thus repenting, he will immediately seize upon the nearest implement and proceed to coax the meter into coughing up the quarter so thoughtlessly deposited in its cold, gassy interior. The meter proving obdurate and unresponsive to gentle coaxing, the ire of the customer is aroused and he assails the gas company's defenceless representative with constantly increasing wrath, to the great detriment of the meter mechanism.

The prepayment meter also presents certain disadvantages to the users that usually affect the company as well. Improvident people receive their pay on Saturday and in a few days the cash is gone. They cannot buy gas for credit, so they use coal, wood, kerosene or gasoline, which they can and do buy on credit. A citizen goes home at night, settles down to read the paper, and at 8:30 P.M. the gas gives fair warning of its intention to strike unless proper lubrication is forthcoming. The citizen finds that, due to these prosperous times, he has no coins on hand of less than $20 denominations. He may have some dimes or dollars, but they are useless. He does not like to run around asking the neighbors for a quarter, so he either retires in the dark, lights up a candle or kerosene lamp, or switches on the electric light, all to the positive detriment of the gas company, which needs the money.

It must also be borne in mind that while prepayment meters can be set to deliver the exact, or at least very nearly the exact, amount of gas for a quarter, or any straight gas rate, they cannot be set to do so if a sliding scale of gas rates is now or hereafter established. Nor can they be adjusted to a readiness-to-serve rate. This is a very serious objection to prepayment meters, as, if a company now has a straight rate in force, a sliding scale or a readiness-to-serve rate may be established in the future, which would make the use of prepayment meters impossible, except on a basis of a monthly settlement with each customer. Such monthly settlements would entail not only an excessive amount of work and expense, but would also result in disputes and wrangling with the customers. It is the writer's opinion that a straight rate for gas is unfair to the company and to its customers, and that the gas rates will gradually be established upon a sliding scale with a fixed price for the first, and every subsequent 1,000 feet of gas used through each meter per month, or upon the still more equitable basis of the readiness-to-serve rate. Having set forth my experiences with and my opinions of the prepayment meter in a vein light, but nevertheless true to life, I now pass to

Methods of Securing Payments of Gas Accounts.—This I have to some extent already covered in a cursory way. Some axioms and rules that I recommend for your consideration to secure good results in securing payment for gas accounts or any other accounts are as follows:

1. Do not sell any gas unless you are reasonably sure you will get the money for it.
2. The best credit is not as good as cash.
3. It is better not to sell than to sell and not to get your money.
4. Do not let fear of your competitors override your sound business judgment in the extension of credit. You are better off to have a deadbeat use electric current from your competitor and not pay for it than to have him use your gas and not pay for it.
5. It is a safe bet that a customer who cannot pay a gas bill for one month, cannot pay gas bills for two or more months.

6. Present bills promptly when due, and follow them up persistently and methodically until paid.

7. If necessary to notify a consumer that his meter will be removed, do so by a courteously worded notice, and not by verbal message. The consumer will like it better, and you do not risk the anatomy of your collector. The honest consumers finally pay the gas bills of the dishonest consumers and it is your duty to keep the amount of these bills as low as possible so that, when the proper time comes, you will not be prevented from lowering your gas rates by the large amount of your bad debts.

Keep an alphabetical list of your uncollectible bills, so that when the parties apply for gas in later years, your clerks will spot them immediately and collect the old bills before a meter is set.

If you accept guarantees explain to them plainly that you expect them to pay all arrear bills on presentation. Remember that the more promptly and the oftener you present past due bills the larger your chances of collecting them. The older a bill is, the harder you will find its collection. Remember that if you make a profit of say 20 cents per 1,000 feet of gas sold, and lose $60 per month in bad debts, you have to sell 300,000 cubic feet of gas per month and collect the money for it in order to make up for your bad debts. It will hurt no one of us to ponder on this occasionally. My experience is that large losses from bad debts are usually due more to lax and incapable management and the collection methods of the gas company than to the customers.

In the collection department all statements should have a neat record on the back, stating the date of each call, the information obtained and the initials of the collector. A code system will prove a time saver. Office ticklers should be used for the filing of the statements, and the first thing in the morning the collector should remove the previous day's partition, so that all statements that should receive attention are each day brought automatically to his notice. If a debtor has promised to pay to the collector on June the 16th, and the collector does not call on him until June the 18th, the debtor has a good excuse for putting the day of payment off for another week.

Before the collectors go out over their routes each morning, the cash collections should be posted on the statements up to the minute. This will prevent the presentation of bills after they have been paid. There is nothing that will more exasperate the public against the company than mistakes of this kind. I regret that I have not been able to do more justice to the subject assigned me.

I thank you for your attention.

The Self-Made Engineer.

[Prepared for the JOURNAL, by "ENGINEER."]

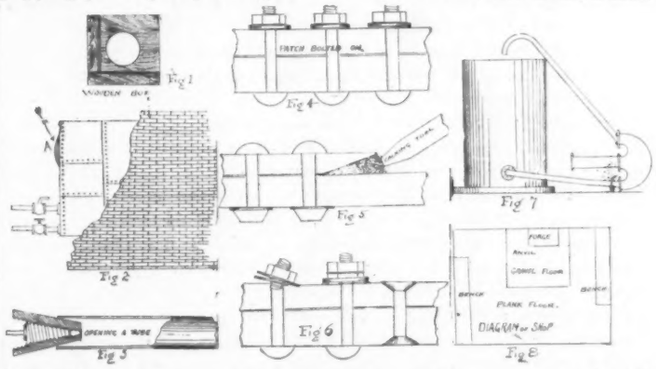
The man who is put in charge of the general engineering and mechanical work of a gas plant often becomes a self-made engineer before he has served a very lengthy time. In fact, I know of a man who went to work as a roustabout for the sake of picking up information that would qualify him for engineering work. To be sure, often the pay received is small, but then excellent opportunities are given for observation and advancement. In one instance a man went to work for $1.50 per day as the helper to a boiler washer. In a few months this man had been promoted to a $2-a-day job as assistant in the engineering department, from which point he was able to make a study of engineering matters and thus increase his value to the company. As time passed he was given charge of more important work with steadily advancing wages, until finally he found himself in the position of what might be termed a self-made engineer. He had received little or no technical instruction and had subscribed for the technical press, but had not given much time to working out to the point of understanding the engineering problems advanced in the journals. He had an opportunity to become a student of mechanics and engineering by subscribing to a course in one of the correspondence schools, but let the opportunity slip. Hence he worked upwards on his own lines. One of his practices involved the making of things required in the plant. In case of a breakdown of the steam plant or machinery he was detailed to put things to rights. On one occasion, having to make a box journal of wood for a shaft, he selected maple stock and shaped the box as in Fig. 1, bolting the bottom and side slab to the same to increase the strength. The hole was bored with a bit and then turned to the right diameter for the shaft with the cutting point of a chisel in a turning lathe. The necessary oil hole was made for lubrication and the box was fitted in place for supporting the shafting. The wood wore smooth very soon and a suitable bearing resulted.

On another occasion the fireman had a blowout in one of the boilers, and as the fire was still hot the incased boiler expanded, as at *A*, on the back shell. This part of the plate had to be cut out and a new portion riveted in. It seems that the fireman had been in the habit of blowing off the boiler soon after ceasing firing, and as soon as this practice was stopped, and the firing not continued, the boiler was allowed to cool before blowing off, with no further trouble ensuing.

Fig. 3 shows a form of tube-expanding contrivance invented by this man for opening the ends of boiler tubes when desired. It consists of a 4-sided section of tapering cones, the inner portions being cut with the threads for receiving the threaded plunger, as shown in Fig. 3. Thus, by turning inward on the handle bar of the threaded inner cone, the tapering sides caused the sectional parts to expand and the tube walls quickly followed suit.

The man in question, who was striving to become a self-made engineer, likewise made a study of boiler plate and rivetting, while chances were afforded him, after hours or during the noon time. Fig. 4 shows one form of belting on the plates. In this instance a patch had to be placed over a wrecked piece in the boiler. The latter was entered and the bolts inserted, head down through the holes. The man outside then put on the nut and tightened the same. In case of necessary calking, a calking tool, of the form seen in Fig. 5, was used, the opening for the calking material being made by shaving down the under side of the plate as exhibited. The calking is, of course, a very useful factor in making the joints tight, and our man devoted considerable of his time to getting the best results with the calking devices.

Fig. 6 shows a botched job that he had to do over again. The man working his way along the road to become a successful engineer cannot afford to lose his reputation by turning out bad patching work, as instanced in this illustration. At the left the bolt is bent and the gripping power partly lost by the tilted nut. It is better to use a lock



nut with the washer, as in the adjoining bolt. Or if the bolt with sunken head is used, then the exterior and inner surfaces of the plate can be made smooth so far as the joining bolts are concerned.

Fig. 7 shows how to make a water tuyere, the tank of which can be a non leaking barrel, if no other cylindrical tank is at hand. If you want a direct tuyere, take an inch pipe, about a foot long, and weld around it a joint like that in the cut; you can pick up such joints in any pipe store. The lower length of pipe which joins the elbow is fitted to the lower part of the tank, while the other end extends up and over the top, as shown.

Fig. 8 is a diagram of a handy shop for general work about a gas plant. It is a good idea to have a cement or gravel floor about the forge and anvil, while the rest can be of planking.

[Continued from page 491.]

Liability of Gas Companies for Injuries Resulting from Escape of Gas.

[Prepared for the JOURNAL by MR. JOHN EDSON BRADY, Attorney-at-Law.]

DESTRUCTION OF VEGETATION BY ESCAPED GAS.

Liability Determined by Usual Rules of Negligence—Company Not an Insurer.—In Gould *v.* Winona Gas Company, 100 Minn., 258; 111 N. W. Rep., 254, decided by the Supreme Court of Minnesota in 1907, the action was brought to recover damages for the destruction of trees standing in the boulevard in front of the plaintiff's premises by gas escaped from the defendant's pipes. The accident was explained by the defendant stating that the severe cold weather had caused the pipes to crack. In the lower court judgment was given for the defendant, but on appeal this was reversed. The Appellate

Court held that the liability of a gas company for injury to trees should be governed by the usual rules of negligence, and not by the doctrine of insurance of safety; in other words, a gas company is liable only for want of due care in the protection of nearby property, and is not held to such extraordinary care as practically to render it an insurer of trees and other vegetation growing near the location of its mains and pipes, against injury from escaping gas.

While this particular point has apparently not been passed on by any other case, there are numerous cases holding that gas companies are bound, in the construction of their plants, in the laying of their pipes and mains, and in the operation of their business, to exercise due care proportionate to the dangerous quality of the material manufactured and handled; thus, by implication, holding that the companies are bound to exercise no more than due care. But this due care extends, also, to the matter of maintaining an efficient system of inspection, and the greater parts of the cases hinge on this latter point. 10 L. R. A. (N. S.), 890.

In the foregoing case the court said: "The record contains no evidence, nor will the court indulge in the violent presumption, that the escape of gas is usual, necessary or inevitable, despite the exercise of due care. There is no justification for the assumption that means of prevention of escape, as by digging the trenches deeper, or otherwise, do not exist and are not reasonable and feasible. Nothing in the record concerning an unusually cold winter bears the faintest resemblance to an act of God. Reasonable care, it is elementary in such a matter, has reference to the known and varying severity of this climate. We agree with the trial courts that leaks in gas pipes may, and frequently do, occur because of the action of frost. But to go further, and say that this is the ordinary course of their operation, in a legal sense, is to fly in the face of common experience. Electricity may, and frequently does, escape from wires, despite insulation, with resulting damage. The maxim applies to such cases. It adds nothing in case of escape of either gas or electricity that such occurrences are, despite no fault of the owning company, other than such as to be inferred from the failure to protect against a familiar and unusual peril from natural agencies."

In order to recover damages from a gas company for the destruction of plants, trees, etc., alleged to be due to the escape of gas from the company's pipes, it must be affirmatively shown that there was negligence on the part of the company. In Denniston *v.* Philadelphia Company, 161 Pa. St., 41 (1894), it was claimed that gas, which had escaped from the defendant's pipe, injured the defendant's vegetation and destroyed his spring. The evidence did not furnish any basis for determining whether the leakage was attributable to the negligence of the company in the construction and care of its line, or came in spite of the employment of the best known skill and appliances to prevent it. The following is quoted from the opinion: "Was the leakage shown by the evidence consistent with skill in the construction and care in the operation of the line, or was it due to the negligence of the company in both, or either? A satisfactory answer to this question must have something more substantial to support it than conjecture; it must be founded upon evidence."

Notice of Defect in Pipe.—The question of notice came up in the case of Dow *v.* Winnepesaukee Gas and Electric Company, 69 N. H., 312; 41 Atl. Rep., 288. The plaintiff was a florist at Laconia, N. H. The Company named as defendant had become insolvent and all its property was sold by the assignee to certain individuals. On March 13, 1907, the plaintiff first noticed trouble with his plants, the leaves of some of the more delicate, nearest the street, dropping off. Three or four days later other plants began to be affected. The plaintiff was unable to discover the cause until, on March 22d, it was thought that a smell of gas was detected. He notified the defendant, and on that day they sent the man in charge of the gas works to the greenhouse. He failed to discover any trace of gas. On March 23d another examination was made and this time gas was discovered to be entering the green house. No attempt was made to remedy the trouble until March 25th, when a portion of the pipe in the street was dug up and some repairs made. But the flow of gas still continued. Of this the defendants were notified, and on March 30th, the break was found and repaired. The break was due to the unskillful manner in which the pipe had been laid, and would have been avoided by the exercise of ordinary care and skill in placing the pipe. It was held that the liability of the defendants did not depend upon their receiving notice or their knowledge of the defect, but upon their observance of care in maintaining the pipe in a reasonably safe condition and so using it as not to unnecessarily injure others. They could not absolutely protect themselves from liability merely on the ground that they did not know that the pipe was defective, or that gas was escaping into the plaintiff's greenhouse. They were bound to guard against both of these things by exercising the proper care required under the circumstances, and in the absence of such care they could be held for any resulting injury, irrespective of notice. But, in this instance it was found that "there was no evidence that any of the defendants' officers or incorporators had knowledge of the negligent construction which caused the break, or any reason to suppose that such break existed, or that gas was escaping, until March 22d." The defendants' liability was accordingly limited to the damage accruing after notice.

Duty of Inspection.—In the case of Siebrecht *v.* East River Gas Co., 21 N. Y., App. Div., 110 (1897), damages were sought to be recovered for negligence on the part of the defendant in allowing a pipe, laid in the ground near the plaintiff's premises, to become out of repair, so that the gas escaped into the plaintiff's greenhouses, destroying the plants. The service pipe, it appeared, was laid under the rails of a street railroad operated by electricity. They were laid in 1886 or 1888. There was a sharp conflict in the evidence upon this point. In the winter of 1894 and 1895 the weather was very cold, and, by the middle of that December, the ground was frozen to a considerable depth. The gas which escaped from the service pipe was prevented by the frozen ground from reaching the surface. Consequently it percolated through the soil until it came to the unfrozen ground beneath the greenhouses, where it sought the surface, entered the greenhouses and destroyed the plants growing therein.

It was claimed by the Company that it was not liable for this damage, for the reason that it was guilty of no negligence. This claim was based upon the theory that it originally laid perfect pipes, the life of which, as demonstrated by experience, had not, at the time of the injuries complained of, expired; that it was not aware of the escape of any gas, and could not be by any system of inspection, as no gas came to the surface of the ground by reason of its frozen condition; that it immediately remedied the defect and prevented the further escape of gas upon being notified; that the condition of the pipe was caused by the action of the electrical current used by the street railroad, which produced electrolytical action upon the pipes, corroding and eating the substance of the pipe until it permitted the gas to escape; that this action was understood by scientific men only, and that the defendant was without knowledge of it. However, one witness testified that, in 1904, he had frequently noticed the odor of escaping gas while waiting for a car in front of the plaintiff's greenhouses. It was held, therefore, that the jury were authorized in inferring that the defective condition of the pipe had existed for some time, that competent inspection would have discovered it, and that the defendant had not exercised the degree of care and prudence which the law imposed, and was, therefore, guilty of negligence. There was also another ground on which negligence could have been predicated. To quote: "We have already observed that there was conflict of testimony concerning the time when the pipe was laid. There was also conflict as to its life. The defendant's proof tended to establish that its life was 25 years; the plaintiff's from 15 to 25 years, if laid in a dry, hard-clay soil; if in wet places, where water gets down quickly, it will corrode in 6 or 7 years. The jury could find that the pipe was laid in 1886, and if so it had been in the ground for 8 years; and if the soil were wet where it lay, then a reasonable apprehension might arise that its life was exhausted and that prudence might dictate its exhumation."

The evidence in Rockford Gas Light and Coke Company *v.* Ernst, 68 Ills. App., 300 (1896), showed that there was a large leak in a gas main belonging to the defendant company, from which it was claimed that gas escaped and destroyed shade trees upon the plaintiff's residence lot. This was denied by the company and it was insisted that the trees were destroyed by drought and worms. While the evidence upon this point was conflicting, the court was of the opinion that the preponderance was to the effect that the trees were destroyed by the action of gas upon their roots. And the company was held liable for the damage done. "In the operation of its business," said the court, "A gas company is bound to exercise such care and diligence as to avoid injury to the health and property of others by the escape of gas. For commercial profit it deals with a dangerous agent, and the degree of care devolving upon it should be proportional to the dangers which it is its duty to avoid. If injury is done to adjoining property, by reason of defective material used in pipes employed to convey the gas along the streets of a city, because of the imperfect manner in which the pipes are laid, or because of failure to repair breaks, whether caused by its own fault or that of another, the in-

jured property owner has a right of action to recover for all damage sustained by him. In case of a break, if it occurs through its own fault, the company is liable without notice. If it occurs through the fault of another, liability attaches as soon as the company has had notice and time to repair. If reasonable inspection of the mains and pipes of a system would have discovered a leak, and such were not made, the company would be liable. If damage occurs from a break which has existed for several days, and which could have been discovered by proper inspection, that is, of itself, evidence of negligence."

In this case the break was caused by the action of frost in contracting the pipe. The leakage began about the first of January and was allowed to continue until the fifth of February following without being repaired. This, it was held, constituted negligence.

Effect of Interference of Third Parties.—Ordinarily a gas company cannot be held liable for damage which results directly from the interference of strangers. Butcher *v.* Providence Gas Company, 12 R. I., 149 (1878), is an instance of a case where the act of a stranger intervened, but not in such form as to free the Company from liability. The plaintiff sued to recover damages from the defendant Company for injuries to the plants in his greenhouse, caused by the defendant's neglect in allowing illuminating gas to escape from its pipes into the city sewers and drains, and thence into the greenhouse. The defendant Company contended that the negligence, if any, was not the Company's, but that of the officers of the city of Providence, in building a sewer and neglecting to properly pack the earth, thereby causing a settling of the gas pipe and the opening of a leak. The Company was held liable. It was handling a dangerous element and was bound, not only to due care on its own part, but also to due care in preventing injury from the careless or wrongful meddling with its works on the part of others. It was true that the Company could not interfere with or prevent the city of Providence from building the sewer; but it had a right to and was bound to see that, in restoring the earth to its place, its pipes were properly supported. And if injury resulted it was bound to see to it that repairs were made as soon as possible.

Rights of Owner of Property where Trees Stand in Front of but Not on His Property.—The right of a person to recover against a gas company for the destruction of shade trees, standing in the highway in front of his premises, was passed on in the case of Donahue *v.* Keystone Gas Company, 181 N. Y., 313 (1905). The plaintiff had the rights of an abutting owner upon the west side of Union street, in the city of Olean, N. Y. In the margin of the street, and directly in front of the plaintiff's premises, but not upon his land, there were 5 maple trees, about 35 years old, "All in thrifty condition and furnishing good shade." These trees stood 25 feet from the front line of the plaintiff's houses and made them attractive to tenants and purchasers. Four of the trees were destroyed by gas which escaped from the defendant's pipes into the soil about the roots of the trees. The defendant claimed that the plaintiff had no legal or equitable interest in the trees, because they did not stand upon the land which he owned, hence he sustained no injury by reason of their destruction. The plaintiff claimed that, as an abutting owner, he had a right in the trees in the nature of an easement attached to and forming part of his premises, and that he was entitled to recover the damages caused to his land by the wrongful act of the defendant. An interesting and important question was thus presented to the court, upon which there is but little direct authority, although the courts have labored long to settle the principles of law governing the rights of those owning land upon a public street where the fee is in the municipal government. It was held that, while the plaintiff did not himself set out the trees, he was entitled to the rights of his predecessor in title as an abutting owner, who did set them out, including the right to collect damages from the company.

Quoting from the opinion of the court: "The maintenance of trees in a street for the purposes of ornament and shade is a proper street use, sanctioned both by statute and custom of the country. The trees thus maintained are a part of the street, to be enjoyed and used by the public traveling thereon the same as a good roadbed, sidewalk, pavement, or anything else in the street which contributes to the comfort or pleasure of the traveler. * * * It is to be observed that we are not dealing with a question arising between an abutting owner and the city authorities, for in such a case the rights of the latter are paramount, so long as the road is kept open and unobstructed. Nor are we dealing with a question between him and a corporation authorized to use the streets for some public purpose, where it becomes necessary to cut shade trees in order to effect that purpose. It is not the question which might have arisen when the defendant many years ago laid its pipes in the street, if it had then been necessary to cut the trees which are the subject of this action in order to do the work properly and they had been cut for that purpose with the approval of the city authorities. The defendant did not let its gas escape with the consent of the officers in control of the street. It did not act in accordance with the law but in violation of the law. It was not a semi-wrongdoer, as were the elevated railroad companies, but an absolute wrongdoer. It was a trespasser and its act was a nuisance which inflicted special injury upon private property, for it reduced the value of the plaintiff's premises. Everyone has a right to use a public street, but no one has a right to stand in front of another's residence and play a hurdy gurdy or fog horn hour after hour and day after day to the annoyance of the owner and his family. That would be trespass, even if the offender did not touch the property of the abutting owner, whose right to damages could not be questioned. If a mere trespasser should cut shade trees standing in a street, the fee of which was in the city, could the abutting owner recover damages? That is in substance the question before us, for while the defendant did not act wilfully in destroying the trees it acted negligently, after due warning, and was a simple wrongdoer."

A more recent case, involving a similar state of facts, is Rockford Gas Light and Coke Company *v.* Ernst, 68 Ill. App., 300 (1896), where it was said: "We do not agree with counsel for appellant (the Company) that appellee (abutting owner) could not recover damages for the destruction of the two trees, planted by her 19 years before, in the street immediately in front of her premises. While it is true that she could have no property in or control of the trees, as against the municipality, yet as against third persons negligently injuring or destroying them, she may recover."

Penalty Against Gas Company Refusing to Furnish Gas Because of Unpaid Bill of Former Tenant.—The sum of $1,769.83 represents the penalty and costs recovered in the case of Shelley *v.* Westchester Lighting Company, 124 N. Y. Supp., 484, recently affirmed by the Appellate Division of the New York Supreme Court The penalty was recovered under Section 62 of the transportation corporation law, on the ground that the Company had refused to supply the plaintiff with gas. The penalty was assessed against the Company in spite of the fact that it acted in good faith, its reason for shutting off the plaintiff's supply of gas being that a former occupant of the same premises owed it for gas previously furnished. While the Company might reasonably feel within its rights in so doing, the fact is that this course is forbidden by a statute in force in New York. Section 62, above referred to, provides that gas or electricity shall be supplied, "Notwithstanding there be rent or compensation in arrears for gas or electric light supplied, or for meter, wire, pipe or fittings, furnished to a former occupant thereof, unless such owner or occupant shall have undertaken or agreed with the former occupant to pay or exonerate him from the payment of such arrears, and shall refuse or neglect to pay the same."

Just prior to the time when the plaintiff took possession, the premises had been occupied by one, who bore with ill grace the illustrious name of Helen Keller, and who departed, leaving her gas bill unsettled. One of the defendant's gasfitters having called was informed of the change of tenancy and that the new tenant, the plaintiff, wished to be supplied with gas. The gasfitter thereupon indorsed upon his order card "transferred," and "Mrs. Shelley takes," and left the meter open for the plaintiff's use. He then told the plaintiff that if she would sign a blank order, which he produced, he would see that the gas was furnished. Mrs. Shelley signed the application with all the blanks left unfilled, with the exception of the residence, and delivered the same to the gasfitter. The application, when signed, read as follows:

> .....hereby make application to the Westchester Lighting Company, for .....to be supplied under the rules and regulations of the Company to the premises, No. 1› Vineyard ave., occupied by ..... as a..... , and agree to pay for the same promptly at the regular price and according to the rules of the Company, it being understood that the minimum charge will be $ ..... per month.

Two days after this transaction another employee of the defendant Company called at the plaintiff's premises and presented her with a bill against Helen Keller. Upon the plaintiff's refusal to pay for the gas used by the former tenant, the employee locked the meter. The plaintiff testifies, and she was not disputed upon this point, that she thereupon went to the office of the defendant and that, upon complaining to the man behind the desk that her gas had been shut off because of non-payment of the bill of her predecessor in occupancy,

he answered that he would look into the matter. The plaintiff then brought her action to recover the penalty of $10, and $5 for each day on which the defendant had failed or neglected to supply her with gas, as provided in Section 62.

In defence it was contended that the penalty can be collected under the statute only upon refusal, after a written application for gas, and that the application in this instance, not having been filled out, could not be regarded as a written application. It was held, however, that the Company could not stand upon this ground. The Company placed its own construction upon the contract for gas by furnishing gas for two days, and by entering the account upon its books as for gas. "We are clearly of the opinion," said the court, "that the plaintiff performed all of the conditions necessary to put the statute in motion, and that she is entitled to recover in this action. To hold that this application was not in writing, because the defendant had failed to physically insert the word 'gas,' where its own agent had accepted the application and had left the gas meter open for the sole purpose of complying with the request, and the corporation had accepted the contract and entered it upon its books, would be to permit the defendant to shield itself by its own wrong.

"The defendant was permitted to go to the jury upon the proposition that the failure to deliver gas was due to inadvertence, which was certainly as much as it had any right to claim; and the jury having found against it upon this point, as well as upon the merits generally, there is no reason for overthrowing the judgment. The charge of the court as to the law was clearly in favor of the defendant, and the criticism now urged is without force.

"The statute imposes the penalty if the corporation 'refuse or neglect to supply gas;' and, while it may be that a slight neglect in absolute good faith might be excused, the facts in this case would not seem to warrant a finding which would exempt the defendant from the penalty imposed by the statute. It is undisputed that the plaintiff went to the office and notified a man whom she found behind the desk of the cutting off of the supply of gas, and the defendant read the meter for months without a change, then changed the meter, and still read it for months without showing any consumption. In the ordinary course of business a corporation supplying gas would look to find out why there was no consumption. It did make a change of meters. It was in a position to know then, if not before, whether there was a compliance with the request for gas."

The decision illustrates how costly it may prove for a gas company to be mistaken as to its rights. Gas companies cannot afford to be ignorant of or ignore the statutes which relate to the conduct of their business. The payment of the penalty and costs involved in this case might have been avoided had the Company not attempted to do just what the statute said plainly it shouldn't do.

The H. I. Lea System of Purifying Gas.

On August 23d United States Letters Patent (No. 968,370) were issued to Mr. Henry I. Lea, of Chicago—assignment of these has been made to the Westinghouse Company, Pittsburgh, Pa.—for an improvement in apparatus for purifying gas. In describing the invention Mr. Lea says:

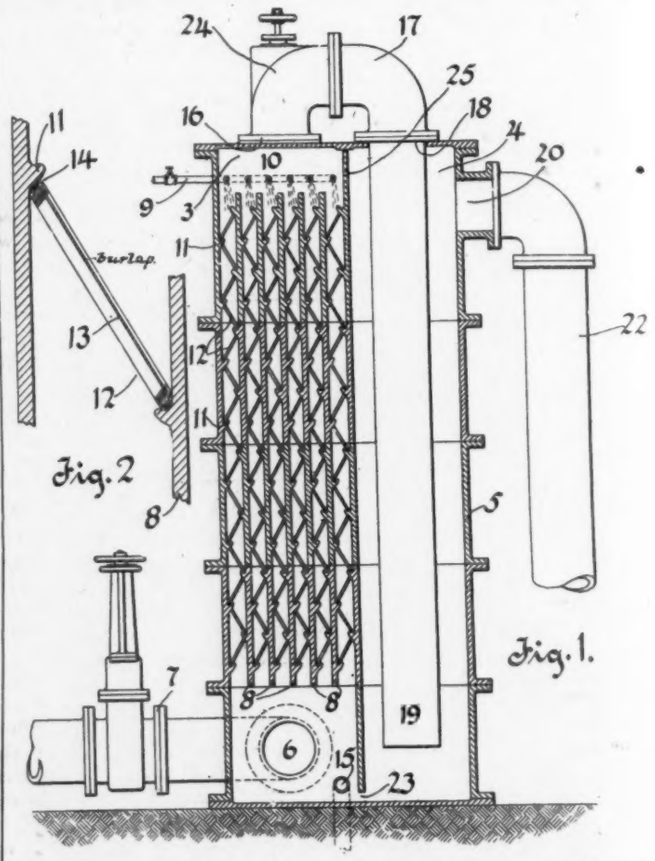
The Lea invention relates to gas purifiers, the object being the production of a simple and efficient apparatus particularly adapted to remove the lampblack and smaller particles of dust from gas.

The apparatus comprises a scrubber chamber through which the gas to be purified is caused to pass, a drier chamber which receives the purified gas delivered from the scrubber chamber, and from which the gas is delivered to the distributing mains or to other purifying apparatus.

The gas in passing through the scrubber chamber is caused to flow through a series of screens, over and through which water is caused to flow in a direction opposite to the flow of gas. Under such conditions the gas carrying the most recrement comes in contact with water which has been utilized in partially scrubbing the gas and the cleanest gas comes in contact with the cleanest water.

In the drawings Fig. 1 is a sectional elevation of an organized apparatus embodying the invention, and Fig. 2 is a sectional elevation of a detail.

A scrubber chamber 3 and a drying chamber 4 are inclosed within a shell 5, which is formed of a number of annular sections superimposed and secured together by flanged connections, or in other suitable manner. The shell 5 is provided near the bottom with an inlet port 6, which communicates, through suitable piping 7, with a source



of gas supply and delivers the gas to the lower portion of the scrubbing chamber 3. A number of partitions 8, which are parallel to each other and to the vertical walls of the chamber 3, are located within the chamber above the inlet port 6. A water supply pipe 9 extends through the shell 5 into the upper portion of the chamber 3 above the partition 8 and delivers water from a number of communicating jets 10 to the chamber 3. The vertical walls of the chamber and partitions 8 are provided with brackets 11, which co-operate in supporting the screen holding frames 12. Each frame 12, rectangular in shape, is provided with means for securing one or more thicknesses of screening 13 in place across it. The screening utilized with producer gas is preferably burlap, but other materials may be utilized. A strip of compressible packing material 14 is secured around the outside of each frame 12 and is adapted to pack the joint between the frame and its mounting members.

Each frame is supported on one of the brackets 11, and is adapted to rest against the adjacent wall or partition, assuming an inclined position, thereby presenting a series of perforations through which all the gases passing through the parallel walls must flow. The water jets 10, which are located in the upper portion of the chamber 3, are adapted to discharge a spray of water or other liquid onto the top screen of each series located between the parallel partitions, and the frames are inclined at such an angle that the liquid will travel over the face of the screen rather than seep through it until it reaches the edge of the screen, and will uniformly flow through onto the upper edge of the next screen, the top of which rests directly below the supporting bracket. With such an arrangement the water will zigzag through the narrow passages and finally is discharged by the lowest screen of the series into a receptacle formed in the bottom part of the chamber 3, below the inlet port 6. The receptacle is provided with an overflow pipe 15 which communicates with a sump pit or any suitable drain.

A port 16, located at the top of the scrubber chamber 3, communicates through suitable piping 17 and a port 18, formed in the head portion of the apparatus, with the drying chamber 4. A pipe 19 communicates with the piping 17 and extends downwardly through the chamber 4. The gas, after leaving the purifying chamber, is conducted by the piping 17 and the pipe 19 to the bottom portion of the drying chamber 4, and after being discharged from the pipe 19, travels upwardly through the chamber 4 and is discharged from an outlet port 20, located in the top portion of the drying chamber. The port

20 communicates, through suitable piping 22, with the gas delivering mains or with other purifying apparatus.

The function of the pipe 19 and the chamber 4, is to cause a quick reversal of direction in the flow of gas and a simultaneous lowering of the rate of flow in order that the water vapor carried forward from the chamber 3, which vapor may exist in objectionable quantities under certain temperatures, may be deposited in the bottom of chamber 4, from which it may flow to the lower end of the chamber 3 through an opening 23 to the overflow 15.

The construction shown, involving an angle valve 24, in connection with elbow 17, is applicable only to a scrubber made up of two or more sections so arranged that either may be cut out of service for cleaning while the other sections are in operation. In a single scrubber, the elbow of piping 17 would be bolted to the partition 25 between chambers 3 and 4, said partition having an opening coinciding with the elbow and located above the water sprays in chamber 3, thus doing away with the angle valve 24.

The scrubber chamber 3 is preferably rectangular in shape and is preferably provided with a swinging door or other opening along one side, through which the screens may be introduced to the chamber and which, when it is closed, will co-operate with the packing material 14 around the frame portions 12 of each screen to form a tight joint. Under such conditions all the gas entering the apparatus through the port 6 is caused to pass through a number of screens which are washed with a continual flow of scrubbing liquid. It is the purpose of the inventor to employ in this scrubber screens of such characteristics as will allow the washing liquid to form films covering the several openings in the screen. The size of the individual opening will, therefore, be determined by the material from which the screen is made as well as by the nature of the liquid used in washing, the cohesive tension of the liquid being the determining factor. The gas, therefore, while finely subdivided in its flow through the screen, meets a further resistance in this film of liquid, and such small particles as may be carried by the gas are, therefore, exposed to the liquid very effectively with a low consumption of liquid. In cleaning some gases, it is found that the particles moistened and retained by the liquid are washed back through the screens against the flow of gas. Under very favorable conditions, therefore, this scrubber would be self-cleaning; but to provide for such cleaning of screens as may be necessary by less favorable conditions, doors are provided in the scrubber shell, as before mentioned, through which the several screens may be easily removed for cleaning.

It will be apparent that the apparatus may be constructed in various ways. In the drawing the parallel partitions 8 are shown as constructed of metal, the brackets 11 being integrally formed on them. It may be found desirable in practice to utilize partitions, casing and and frame of wood or other material. It may also be found desirable to modify the construction of the drying chamber, and all these changes may be made without departing from the spirit of the invention.

[Published by Courtesy, Bureau of Mines.]

The Explosibility of Coal Dust.

The recently created Federal Bureau of Mines has just issued a Bulletin on the explosibility of coal dust, with chapters by Messrs. J. C. W. Frazer, Axel Larsen, Frank Haas and Carl Scholz. The Bulletin was prepared by the Technologic Branch of the United States Geological Survey, which is now a part of the Bureau of Mines, and, therefore, will be known as Geological Survey Bulletin, 425, but will be distributed by the Bureau of Mines. The author of the Bulletin, Mr. George S. Rice, Chief Mining Engineer of the Bureau, goes fully into one of the most serious and perplexing problems that the coal mines have had to contend with in the last few years. He traces the growth in the belief in the explosibility of coal dust, summarizes the experiments and mine investigations that have established this belief and gives the present status of preventative measures.

In the introduction, Mr. Rice says: "Only within comparatively few years has the dry dust of bituminous and lignitic coal been generally recognized as an explosive agent, more insidious, threatening and deadly to the miner than firedamp. Firedamp carries its own flag of warning—the 'cap' in the safety lamp, but coal dust, though visible, does not attract attention until present in large quantities. Firedamp is of local occurrence and, except in notable and very exceptional cases, is controllable by careful manipulation of the ventilating currents. If by mischance a body of firedamp is ignited in a mine, the force of the explosion is terrific, but the effect is localized unless dry coal dust is present, or unless (as it very rarely happens) an explosible mixture of methane gas and air extends through large areas of the mine. In a dry mine dust accumulates everywhere, and the blast from the ignition and combustion of bituminous dust may traverse miles of rooms and entries and wreck structures at the entrance of the mine. The comparative potential destructiveness of gas and of bituminous dust is strikingly shown by the history of the Pennsylvania anthracite mines. These mines not infrequently have large inflows of gas, and the resulting mixtures of gas and air have sometimes been ignited, yet no such wide sweeping explosions have taken place, despite the presence of dry anthracite dust, as have happened in excellently ventilated bituminous mines."

Mr. Rice reviews the experiments into the explosibility of coal dust in foreign countries, dwelling to considerable length upon the attitude taken in France by the engineers, who, until the great disaster at Courrieres (1906), which cost 1,000 lives, did not believe that coal dust would explode without the presence of firedamp. Since that terrible disaster a testing station has been established in France and now the French engineers are fully convinced of the dangers of coal dust.

"The coal dust question in this country," continues Mr. Rice, "cannot be said to have awakened widespread interest among mining men, until the terrible disasters of December, 1907, which resulted in the death of 648 men. In response to a demand by those interested in coal mining throughout the country, Congress (1908) made an appropriation for the investigation of mine explosions, and the United States Geological Survey was charged with the investigation. A testing station being at once decided upon, such was established at Pittsburgh, Pa.

"While it is probable that for several years the leading mining men in the country have believed in the explosibility of coal dust without the presence of firedamp, yet, until the public demonstrations were given at the testing station, during 1908–09, and reports were received of similar tests made abroad, a large proportion disbelieved. These tests were so convincing to those who saw them, and such general publicity has been given to them, that it is now exceptional to find a mining man who does not accept the evidence of the explosibility of coal dust. The question of the day no longer is, 'Will coal dust explode?' but 'What is the best method of preventing coal dust explosions?'"

The following are some of the tentative conclusions of Mr. Rice on the dust problem:

"That coal dust will explode under some circumstances, both in the presence of firedamp and without it, is now generally accepted by mining men. The writer fully agrees with this and takes the following views of the explosibility of dust and the conditions necessary for explosion.

"Experiments at Pittsburgh indicate that, under ordinary conditions, the dust must be from coal having at least about 10 per cent. of volatile combustible matter; though, in certain foreign experiments, it is claimed explosions were obtained with charcoal dust.

"Dusts with higher percentages of volatile combustible matter are more sensitive, ash, moisture content and size being constant. This view is based partly on the preliminary experiments at Pittsburgh and on the results of experiments of M. Taffanel and other foreign investigators. Where there is a large amount of dry coal dust, judging from the Pittsburgh experiments, a humid atmosphere has little effect on ignition of dust or propagation of an explosion. A long continuance of the humid conditions renders the coal dust moist and inert, but the presence of moisture in the air at the moment of explosion is not sufficient to prevent an explosion; that is, not enough moisture is carried by the mine air to reduce materially the temperature of the flame. Fully saturated vapor at 65° F., an ordinary mine temperature in this country, weighs 6.78 grains per cubic foot (15.5 grammes per cubic meter). Coal dust suspended in such a saturated atmosphere, in a cloud of moderate density, weighs, say, 200 grammes per cubic meter. At the figures given the weight of vapor is but 7.8 per cent. of the weight of dust. The Pittsburgh experiments with wetted dust showed that several times this percentage of moisture in the dust, in addition to a nearly saturated atmosphere, were required to prevent propagation.

"Probably, with a low dust density, the relative humidity of the air would be an important factor in tending to prevent the initiation of an explosion; however, the great purpose of artificially humidifying mine air is that it may serve as a vehicle for carrying water to the dust."

Mr. Rice concludes by reviewing the various remedies that are offered for the coal dust problem, giving the good and bad points of each. This Bulletin may be obtained by addressing the Director, Bureau of Mines, Washington, D. C.

A Safe Device to Light the Way of the Meter Reader.

It is surely a dangerous thing to throw half-burned or smoldering matches upon the floor in any portion of a residence or business building, even though the floor be of cement, for an accumulation of one thing or another may catch fire from a match not wholly extinguished. Furthermore, many object to having the floors of a house, or even the cellar floor, littered with stumps of matches, and some meter readers are not over-careful men. Wherefore, looked at from every standpoint, it is to be desired that these gas company employees should carry an electric pocket torch, of convenient size, so that it may be flashed upon the face of the meter index, making unnecessary the lighting of matches. The Connelly Iron Sponge and Governor Company, of New York, say that it has the necessary article, an illustration of which is here given. Accordingly there is no excuse for any gas company following the old-fashioned way of holding a naked light near the dial of a meter, a partially extinguished match being left in the premises of the customer.

A Modern Roadway, DeKalb County, Ga.

The "Southern Ruralist," for mid-August, in its editorial comment on live matters tending to advance the rural interests of the State, had this to say: There is now being built in DeKalb county, Ga., a 20-mile stretch of what is believed to be the best road in the world. Though it leads from Atlanta, this is distinctly a country road, as there is no important town between its two termini. It may, therefore, appropriately serve as a model for country road builders to pattern after and aim at. This is, of course, a macadam or broken rock road. Though in this respect the highway differs from the majority of new roads in the South, it is similar to many hundreds of miles built during the last half-dozen years. It should be noted, in passing, that the principles of construction are identical for all good roads. Grading and drainage are indispensable. The mere matter of surfacing is of secondary consideration, and is susceptible to very many variations, cost and durability being the controlling considerations. The bicycle was the great promoter of good roads. Its place in this respect has been supplanted by the automobile. This last factor, however, while potent as an agent in road building, has put roads to their severest test. However much new road construction may be due to the demands of the auto, which machine is an insatiate destroyer of all roads it travels. Its wear on road surfaces is terrific. This wear results in before unknown nuisance of dust. It is against these twin factors—wear and dust—that the present road engineer must contend. It is to meet these two conditions that a new method of road treatment has been introduced on the road mentioned. Road tar is the material used for accomplishing the end in view. It is applied as a binder to the broken stone. The immediate result is a road surface nearly as hard and smooth as asphalt, and with wearing properties much like this ideal but costly material. The tar is applied hot, by a special sprinkling machine, before rolling. An interesting and important point is the fact that this material is a home product. For its production common gas tar must be redistilled, and the Atlanta Gas Light Company has installed apparatus for producing this road tar in large quantities. It is extremely important that the use of this material has increased the cost of building the road mentioned only about 15 cents per yard, and its construction has been under the inspection of representatives of the Government Office of Public Roads. Bulletin 38 of that office says of this new form of road making: "It is smooth and firm, of a more resilient character than asphalt, is practically noiseless and almost dustless." Another very important point mentioned in the same publication is that careful test shows less than ¼ as many germs in the atmosphere over a tarred road as were found above an untarred road in the same neighborhood. Here, then, are the advantages: Durability, comfort, health.

Items of Interest
FROM VARIOUS LOCALITIES.

Mr. S. W. Miller, Superintendent of the Annville and Palmyra (Pa.) Gas Company, says that the supply to the adjoining towns or settlements of Hershey and Hummelstown will be turned on by the 10th prox. The correspondent who furnisned this to us adds: "Hustling Miller has made good every promise put forth by him when he came here only a few weeks ago. Just think of it! Artificial gas in Palmyra during 'Old Home Week,' or any other week!"

"B. R.," sends this under date of September 9th from Denver, Col., respecting the matter detailed: Dear Journal—I'd like to know why the impression has gone abroad that Mr. H L. Doherty and his staff are favoring electric current output increase, rather than the good, old gas stream's extension. Just to show you that the statement in such respect is well-wide of the truth I submit the following condensed table regarding the annual statements in each division as to the Company's doings in the years compared:

General Statement.	May 1, 1910.	May 1, 1909.	Increase.
Miles of main.....	254.3	229.7	24.6
Number of gas consumers.....	31,219	28,140	3,079
Cubic feet of gas sold for year..	1,007,972,600	908,031,200	99,941,400
Number of ranges connected...	24,357	21,740	2,617
" water heaters connected	9,780	8,409	1,371
" other appliances "	20,366	20,327	39
" electric consumers	28,571	24,859	3,712
" 16-candle power lamps connected	481,227	429,940	51,287
Kilowatt hours sold for year....	33,130,192	29,612,154	3,548,038
Number motors connected	2,292	2,155	137
Horse power connected.....	15,172	13,172	2,000
Number arc lamps in use.....	3,299	3,182	177
" electric signs connected.	703	491	212
" 50-candle power lamps connected	912	787	125

Now I submit that a 10 per cent gain for a twelvemonth in gas send-out is very light evidence of inattention, especially so when it is considered that it is a 10 per cent. increase over a total output in the last decade stage of a billion cubic foot production. It virtually, in fact, is an 11 per cent. increase; furthermore, that business was done over a total receipt therefor of 10 per cent. plus in dollars of gross receipts. The electric ledgers show an increase in kilowatt hours of 12 per cent., but the gain in dollars of gross receipts was only 8.7 per cent.; and how does an increase of 13 per cent. in number of ranges connected strike you? Oh! No. Gas is getting its "chance" out here; in fact, the public would neither stand nor sit for any other way of working. And how does an increase of 24.6 miles in the main system—not a pipe in it is less than 3 inches diameter either, and that size goes only in a few alleyways—doesn't look much like inattention to plant needs; neither does the amount of money put into the generating and storage divisions. Ten benches additional in the coal division, 50 per cent. increase in the water gas sets, a 500,000-foot holder, to equalize distribution in a certain rather "illogical" local bit of territory—how do they look for neglect? Suppose I say that 2,983 meters were installed in the places of as many new consumers and that "all but" 6,000 new meters were purchased during the year! But it looks to me that I've said or written enough to show that gas gets its good chance in Denver; and in that understanding I will close my screed by remarking that the verdict of "Well done, good and faithful servant" was uttered by the shareholders when they re elected the Directors whose directing for the year brought about such splendid results. In turn the Directors named the following officers, with the naming of which I will terminate my random chapter on how gas went ahead last year in Denver: President, H. L. Doherty; Vice-President and General Manager, Frank W. Frueauff; Vice-President and General Superintendent, Wm J. Barker; Secretary, Clare N. Stannard; Treasurer, John T. Brady.

The addition to the main system of the plant of the Allentown (Pa.) Gas Company this season amounts to not far from 9 miles of pipe, the principal item in the extending being chargeable to the hooking-up of the settlement known as Whitehall township. Superintendent Frick had, as his understudy on this work, Mr. Robert Klar, of the United Gas Improvement Company's "Roving staff."

"V. M. M.," writing from Dixon, Ills., under date of September 13th, incloses the following: "Mr. Fred. J. Maxwell, Auditor of the Lee County (Ills.) Lighting Company, and of the Sterling, Dixon

and Eastern Electric Railway Company, has been promoted, and although we would wish that he could continue on here, nevertheless we wish him all possible good luck in his new field of duty. The latter is in Fond du Lac, Wis., and there he will assume charge of the auditing tasks connected with the administration of the Eastern Wisconsin Railway and Lighting Company, of Fond du Lac, and of the Wisconsin Electric Railway Company, of Oshkosh. The accounting departments of the two named companies were recently merged, and it was determined to have that work centered in Fond du Lac. Mr. A. J. Winkle succeeds Mr. Maxwell in the Dixon position."

THIS is from Mr. W. A. Aldrich, Engineer of Construction, "Compania de Gaz de Guadalajara, Mexico," and it was sent from that place under date of the 3d inst.:

Dear JOURNAL: Yesterday I sent out my first canvasser (a Mexican) for the purpose of feeling the pulse of the people in order to see if I could get a line on the reception our commodity is likely to receive when we are ready to lay it on. I am inclosing you his report for one day, just as it was written, and although its phraseology is unique, it nevertheless gave me peculiar satisfaction. While I am keeping very quiet on the subject of light, I am perfectly sure that our electric competitors will know we are in the lighting business, as soon as we have placed a few "Humphreys" around. We will be furnishing gas by March 1st, 1911. The contract for holders and apparatus has been awarded to the Stacey Manufacturing Company, and the Laclede-Christy folks, of St. Louis, will supply the benches and benchwork."

THE report of Senor Luis Bravo, "Reprentante Cia de Gaz de Guadalajara," as inclosed by Mr. Aldrich, is as follows:

2d September of 1910.

"Following my work of the last day visiting the families home for home and explain them the advantage and cheap of gas for cook and light. I saw about 40 families and I say to them that gas will 40 per cent. less be that of the cost of light and cook. I sure am of the contract of Jose Cuevre to light his all barrooms. He is proprietor now about 15 or 20 barrooms.

"All the families are pleased because they will gas home for cook and light and I am very sure the gas will be very much demanded.

"I am sure to do business very good."

THE Kenton (O.) Gas Engine plant, which was sold recently at receiver's sale to Mr. W. B. Gramlich, of Toledo, will be continued in operation by the gentlemen whom the purchaser represents.

THE proprietors of the Columbia (Pa.) Gas Company have completed the plans for the proposed reconstruction of that plant, and, in fact, are soliciting bids under the arranged scheme. It will virtually be a new works when the reconstruction shall have been completed.

IT is worthy of note that State charters have been issued for the incorporation of the Williams Gas and Electric Company, the Palmer Gas and Electric Company and the Forks Gas and Electric Company, to supply gas and electricity in the named Pennsylvania townships It is noteworthy that the incorporators—Messrs. B. F. Cresson, T. F. McPherson and James W. Fox—are all connected with the Easton (Pa.) Gas and Electric Company.

THE 2,000,000 cubic foot gasholder which has been contracted for by that Nestor in the gas business—Mr. W. W. Scranton—for the better supply of Scranton, Pa., will be completed in ample time for the winter business. The erectors are the Riter-Conley Company, and the work is under the direct supervision of Mr. Willard B. Osborne. The holder is to rest in a steel tank, and is to be of the 3-lift order.

IT is estimated that new purifying and meter houses of the Lynn (Mass.) Gas and Electric Company, to be constructed from the plans of Architect C. T. Main, will involve an expenditure of $50,000.

THE voters of Nebraska City (Neb.) have agreed to the proposition under which the existing Gas Company will operate under a franchise having a life of 20 years. The vote was 228 in favor, to 87 opposed. The gas rate there, by reason of this agreement, is reduced about 15 per cent.

THIS is from San Francisco, per the pen of "M. T. L.," under date of the 9th inst.: "The Gas-Elec.-Co. Social Club, of San Francisco, which is composed of employees of the San Francisco Gas and Electric and of the Pacific Gas and Electric Companies, held their first grand barbecue, the afternoon of last Monday, the scene of the festivities being Camp Taylor. Guests to the number of 250 shared the pleasures of the day, and these were many and diverting. The Committee (and its members richly and well-merited the hearty votes of thanks subsequently accorded them) was thus composed: D. A. White, J. J. Cunningham, Chas. Barrett, Frank Oldis, J. S. Jordan and Lawrence Walsh. The officers in charge of the affairs of the Association are: President, D. A. White; Vice-President, J. J. Cunningham; Secretary, Frank Oldis."

THE voters of Hudson, Wis., have, in special election and by 115 majority, assented to the terms of the franchise under which the Byllesby Company, of Chicago, through the agency of its St. Croix branch, will supply gas in the named place.

THE St. Louis County Gas Company, which is an offshoot or dependency of the North American Company, and which has the right to supply gas in certain sections of St. Louis county, which gas it has purchased and is purchasing from the Laclede Gas Company, has notified the latter that it is preparing to construct a works of its own. It has purchased 44 acres of land, on Gratiot road, between the tracks of the Frisco and the Terminal Companies, and thereon will construct a plant equal to an output of 1 to 1½ millions cubic feet of gas per day. The concern is capitalized in $300,000, and has no bonds. At the present time the Company is sending out an average of ½ million cubic feet per day, through a piping system that covers 136 miles of streets. The system is planned, in the new construction proposed, to cost $500,000, and the Company is not only in every sense a solvent one, but can command any capital that it believes necessary to accomplish its purposes. Its guiding spirit is Mr. A. C. Einstein, who is at once its President and Purchasing Agent.

MR. D. C. SLATESMITH, for quite a while Inspector for the Gettysburg (Pa.) Gas Company, has resigned from that service to accept an important place with the Bindly Hardware Company, of Pittsburgh, Pa. His successor at Gettysburgh is Mr. Clarence Bumbaugh.

Mr. ALFRED R. WAGAR is the Superintendent of the Chemung County (N. Y.) Gas Company. He proposes to go over the main system thoroughly, even if such going over means an expenditure of time and money.

MR. G. W. AULT and associates are before the Council of San Marcos, Tex., for the right to construct and operate a gas works there. Mr. Ault's headquarters are, we believe, in Houston, Tex.

MR. GEORGE J. FORAN has been retained by the Newton (N. J.) Gas and Electric Light Company to determine that which the Company should do in the proper reconstruction of its plant.

WE are informed that Mr. Charles H. Printz has resigned from the service of the Western Gas Construction Company, to join the staff of the Stacey Manufacturing Company.

AT a meeting of the Board of Directors of the Washington (D. C.) Gas Light Company, held the 5th inst., it was resolved to postpone the shareholders' meeting (called for the 26th inst.), for the purpose of obtaining their sanction or otherwise, to the proposed financial readjustment of the Company's capital indebtedness, to the 14th prox. The Directors also made important changes in the original readjustment proposition. They recommended to the stockholders' meeting that hereafter all dividends shall be paid upon the fair valuation of the Company's property employed in the public service valued by competent and disinterested appraisers at $13,000,000, and not upon the face capitalization of $2,600,000, dating back to 1896—which even at that time was regarded as below the value of the Company's property employed in the public use. The disparity at that time, it was asserted, was emphasized by the fact that in 1898 the Company was offered by prospective purchasers $8,400,000 for its property, then, as now, capitalized at $2,600,000. The Board further voted unanimously to recommend to the stockholders' meeting the adoption of a resolution for an issue of gold coupon bonds, running 50 years and bearing interest at 5 per cent. per annum, said issue not to exceed $5,200,000. Of this issue, $600,000 in round numbers was advised to be devoted to the refunding of the 4 per cents. now outstanding, $2,600,000 of the issue was advised to be offered to the stockholders at par, and the proceeds of the sale to them were advised to be applied to the liquidation at par of the existing certificates of indebtedness now bearing 6 per cent. interest per annum. The net result of this process would be an annual saving of $20,000 to the Company in interest. The remaining $2,000,000 of the issue was advised to be held exclusively for the financing of future betterments. This portion of the issue was advised also to be offered to the stockholders at par from time to time, as occasion should require. The fund so held for betterments is not to be certified by the trustee under the deed of trust securing the said bonds for use, save in annual installments as the necessary enlargement of the Company's plant shall require.

MR. J. F. SEAMON is in charge of the work of placing two 11-foot water gas sets of the U. G. I. Company's improved type, the contract for which was awarded some time ago to the U. G. I. folks by the Laclede Company, of St. Louis. The machines will be operated by November 1st.

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MONDAY, SEPTEMBER 19, 1910.

The Market for Gas Securities.

The changes in Consolidated values since Friday last are up ¼ point in the bid—129¾ to 129½; this at noon of the 16th. Another step in the readjustment of its affairs is the formation of the Corporate Organization and Audit Company, which has an option on the 3 blocks bounded by 16th and 19th streets and 9th and 10th avenues, at $2,500,000. Brooklyn Union is acting as though something is likely to come about in its financial doings. The quotation for it is 133 to 135. The general condition of the market is favorable to holders.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

SEPTEMBER 19.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	129⅝	130⅛
Central Union Gas Co. —				
1st 5's, due 1972, J. & J.	3,000,000	1,000	98	101
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas				
Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98½	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	133	135
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¼	107
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	¾	⅞
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	90	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	73	73¼
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed				
Gold Bonds	7,660,000	1,000	104	106¼
Cincinnati Gas and Electric				
Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st				
Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. &				
Heating Co.	1,682,750	100	90¼	91
Preferred	3,026,500	100	75¼	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	106½	—
Mortgages, 6's	3,600,000		99	100
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	3,500,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100½
Detroit Gas Co., 5's	881,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis	10,000,000	100	100	100½
Preferred	2,500,000	100	85	86½
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	80
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	81	81½
Preferred	25,000,000	100	91½	92
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	106	107
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	100	102
St. Paul Gas Light Co.	1,500,000	100	45	47
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Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	90	95
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	100	104
Washington (D. C.) Gas Co.	1,600,000	200	383½	385
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

DIVIDEND NOTICE.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, Sept. 14, 1910.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable Oct. 15th, 1910, to stockholders of record at the close of business, Sept. 30, 1910. Checks will be mailed.

1841-4 LEWIS LILLIE, Treasurer.

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New advertising, or changes in standing ads., to assure attention the issue following their reception, must be in hand on Wednesday.

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Utilize Your Gas Liquor.

NO EXTRA LABOR OR OPERATING EXPENSES.

IMPROVED AMMONIA CONCENTRATOR.

About 130 in use. Write to

STROH & OSIUS, Patentees, or

CHIGAN AMMONIA WORKS, - Detroit, Mich.

H. Thurston Owens,

CONSULTING ENGINEER,

LIGHT, HEAT AND VENTILATION,

1147 Broadway,

NEW YORK CITY.

WILLIAM A. BAEHR,

CONSULTING ENGINEER,

Peoples Gas Building,

CHICAGO.

Also Representing

The Bartlett-Hayward Company.

EDWIN E. WITHERBY,

SPECIAL REPRESENTATIVE

GAS MACHINERY COMPANY,

CLEVELAND, O.,

Will advise on commercial engineering subjects and operation of gas and electric properties.

40 WALL STREET, - NEW YORK.

GLENN MARSTON,

NEW YORK CITY.

MUNICIPAL STATISTICS.

Information for New Business and Commercial and Municipal Ownership Campaigns. :: :: :: :: ::

CIVIC AND BUSINESS MEN'S ORGANIZATIONS PERFECTED.

Position Wanted.

Superintendent of gas company in Western city of 25,000 desires to change location for personal reasons. Married; strictly temperate. Experienced in both gas and electricity. References if desired.

1837-6 Address, "M. S.," care this Journal.

WORKING SUPERINTENDENT WITH EXCELLENT RECORD.

The owners of one of the successful gas light companies in Massachusetts want to secure for their working superintendent a position of a somewhat similar character in a gas company. This superintendent has an exceptionally fine record and has outgrown present position. We can give you the history of his advancement during the past 15 years. His habits are absolutely temperate and character of the highest standing.

Address, "SUPERINTENDENT,"
1841-2 Care this Journal.

WANTED,

By a man 30 years old, a position as general foreman or foreman of a coal or water gas plant. Twelve years of practical experience in the manufacture and distribution of coal and water gas and construction work. Can get results. Good references.

Add ess, "GOOD RESULTS,"
1841-1 Care this Journal.

Gasfitter Wanted.

Steady work the year round for young man who can do gasfitting, take care of gas arcs, read meters, etc. Address,

SAULT STE. MARIE GAS AND ELECTRIC CO.,
1841-2 Sault Ste. Marie, Mich.

WANTED,

By a Progressive New England Gas Company, a Young Man as Office Assistant.

One acquainted with modern methods required. Address, stating age and experience,
1841-3 "M. N.," care this Journal.

Wanted, a Party with $20,000,

To take one-half interest in a gas plant and to act as superintendent or manager. All of the money to be invested in the plant for extensions and betterments and to pay off a small floating indebtedness. The plant is in a manufacturing town with 3,000 population.

Address, "H. W. MEUSCHKE,"
1840-2 SEDALIA, MO.

WANTED,

Working Foreman for Gas Works.

One who understands benches, laying mains and services. Must be sober.

Address, "FOREMAN,"
1841-2 Care this Journal.

WANTED.

Gas Engineer, Experienced in Designing and Constructing Gas Benches.

Must be competent to make estimates and direct office work. State age and previous experience. Give references. Address, "MANUFACTURER,"
1841-1 Care this Journal.

Salesman Wanted

To canvass gas companies in the Middle West with a complete line of gas ranges and appliances. Must have previous experience in this line and a thorough acquaintance with gas companies. A liberal salary will be offered to the right man.

1836-6 RATHBONE, SARD & CO., Aurora, Ills.

For Sale Cheap,

Two Exhausters (Wilbraham type), belt drive.

One McDonald Station Meter, 8 feet by 8 feet.

One Connelly Automatic Street Main Governor.

One 30,000 Cubic Foot Gasholder, brick tank.

One 40,000 Cubic Foot Gasholder, brick tank.

One 170,000 Cubic Foot Gasholder, brick tank, 2-lift.

Ammonia Washers, Scrubbers, Pumps, Valves, etc.

5,000 Bushels of the Best Western and Connelly Oxide.

All of the above are in excellent condition and sold only because of the discontinuance of the gas plant. For further particulars apply to

ZANESVILLE GAS LIGHT COMPANY,
1838-4 Zanesville, O.

FOR SALE,

NEW GAS PLANT IN MIDDLE WEST.

Town of 10,000. Operated 1 year on paying basis. Address, "B. O. K.,"
1840-2 Care this Journal.

FOR SALE.

Tenders will be received for the following second-hand benchwork, up to August 30th:

Arches, 7 feet 6 inches; retorts, 14 inches by 26 inches—McIlhenny lids; need grate and bearing bars. The equipment of about 20 free-firing benches of 6's; furnaces, 12 inches to 14 inches and 28 inches deep. Mains, etc., old style. Bridge pipes, with plugs, old style. The iron in these is in good condition. For particulars, address,

L. J. MONTGOMERY,
1836-tf 150 Nassau street, New York City.

The new owners of the properties of the Grand Forks Gas and Electric Co. having decided to discontinue the department of which I have been the head for the past five years, it becomes necessary for me to look elsewhere for a position.

Am 32 years of age, married, and have had 12 years' experience in the manufacturing, distribution and new business departments of gas and electric plants.

Am thoroughly familiar with the most modern methods of manufacturing and distributing gas and the selling of both gas and electricity; especially well posted in the selling of gas and electricity for power purposes.

Have a knowledge of chemistry as applied to gas manufacturing, and of the methods of converting the by-products into profitable commodities.

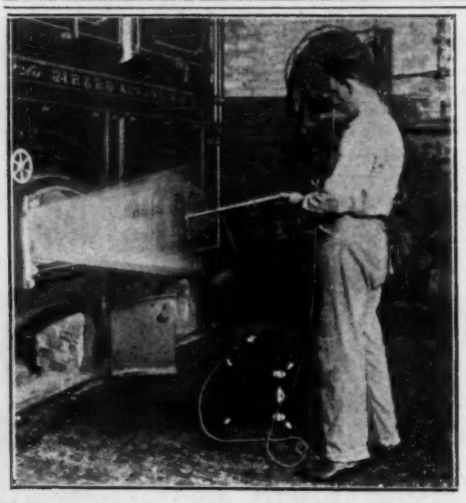
Five years ago, when I assumed charge of the lighting department of the Grand Forks Gas and Electric Company, Grand Forks was one of the poorest lighted cities in the country; to-day it advertises itself (and with good reason) as the best lighted city in the Northwest.

I desire a position as superintendent of the gas division of a combined plant, or as manager of the new business department of a gas company in a city where active competition exists.

References will be furnished.

A. E. MURRAY, Grand Forks, N. D.
1841-1 Care of Red River Power Company.

The Light, Heat & Power Corporation, Boston
CONTRACTING ENGINEER
Electric Light and High Pressure Gas Plants. Equipment, Material and Supplies.
131 State Street, Boston, Mass.
Cable Address, "LIHEPCWCO." Code, LIEBER'S.



BROWN ELECTRIC PYROMETERS

For all ranges of temperature. Particularly advantageous to Progressive Gas Works. :: :: :: ::

THE BROWN INSTRUMENT COMPANY,

315 Walnut St., Philadelphia. Pa.

BRANCHES, - - PITTSBURH, CHICAGO.

Made in 3 and 4 Burners.

AMERICAN 1910-A

INVERTED GAS ARC LAMP.

YOU WHO ARE LOOKING FOR GOOD THINGS NOTE SOME OF THE EXCEPTIONAL FEATURES OF THIS LAMP.

The Ventilator is made in two vertical hinged sections which may be easily opened, removed if desired, and locked automatically.

The Valve may be removed for cleaning by loosening ONE set screw and turning a hexagon nut. No Springs to get out of order.

All working parts accessible, removable and interchangeable, even while lamp is in operation.

Each Burner has a Separate Gas Adjustment which may be locked after correct incandescence is obtained.

Mantles are suspended in a Plate which raises and lowers on two guide rods—No Jar—No Warping—Great Saving in Maintenance Costs.

Porcelain Burner Noses are held firmly in position by German Silver Cap.

Best Material. Skilled Workmanship. Every Lamp guaranteed mechanically perfect.

A LABOR SAVER. A LIGHT GIVER. A PRICE SATISFIER.

CORRESPONDENCE SOLICITED.

AMERICAN GAS LIGHT COMPANY,

KALAMAZOO, MICH. BOSTON, MASS. MANCHESTER, ENGLAND.

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October, 1910. New York City. Officers: President, Wm. H. Bradley, N. Y., City Secretary, A. B. Beadle, 29 West 39th street, N. Y. City.

Canadian Gas Association.—Annual meeting, June, 1911. ————————. Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, Nov., 1910. New York City. Officers: President, C. R. Huntley, Buffalo, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, December. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, A. K. Quinn; Newport, R. I.; Secretary, Walter G. Africa, Manchester, N. H.

Illinois Gas Association.—Annual meeting, time, March, Chicago, Ills. Officers: President, A. S. Harrington, Chicago, Ill.; Secretary-Treasurer, C. B. Strohn, Elgin, Ill.

Illuminating Engineering Society.—Annual meeting, Baltimore, Md., Oct. 1911. Meetings of Sections, monthly. President, W. H. Gartley, Philadelphia, Pa.; Secretary, Preston S Millar, 29 W. 39th street, N. Y. City. Sections: New York: Secretary, Albert J. Marshall, 227 Fulton street. New England, Secretary, L. D. Gibbs 39 Boylston street, Boston, Mass. Philadelphia, Secretary, F. N. Morton, Broad and Arch streets Chicago, Secretary, T. R. Beebe, 157 Michigan avenue,

Indiana Gas Association.—Annual meeting, January 19, 1911, Fort Wayne, Ind. Officers: President, Carl H. Graf, Indianapolis; Vice-President, S. E. Mulholland; Secretary-Treasurer, Philmer Eves, Indianapolis Gas Company, Indianapolis, Ind.

Iowa District Gas Association.—Annual meeting, time, June, 1911, ————————. Officers: President, Austin Burt, Waterloo, Ia.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ———— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association—Annual meeting, time, Sept. 1911; Battle Creek. Officers: President, A. P. Ewing, Detroit, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April 13, 14 and 15, 1911; St. Louis, Mo. Officers: President, R. J. Irvine Secretary and Treasurer, W. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, December, 1911: Boston. Officers: President, E. N. Wrightington, Boston; Secretary, Louis Stotz, 36 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May 16, 17 and 18, 1911; Pittsburgh, Pa. Officers: President, John M. Garard, Columbus, O, Secretary, T. C. Jones, Delaware, O. Editor Wrinkle Department, F. W. Stone, Ashtabula, O.

New England Gas Association.—Annual meeting, third Wednesday in February; Boston. Officers: President, W. H. Snow, Holyoke, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

Oklahoma Public Utilities Association.—Annual meeting, May 9, 10 and 11, 1911. Officers: President, E. C. Reynolds; Secretary, Galen Crow, Guthrie, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. 20, 21 and 22, 1910, Los Angeles, Cal. Officers: President, W. B. Cline, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 925 Franklin street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1911, Reading, Pa. Officers: President, J. H. Keppelman, Reading, Pa.; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

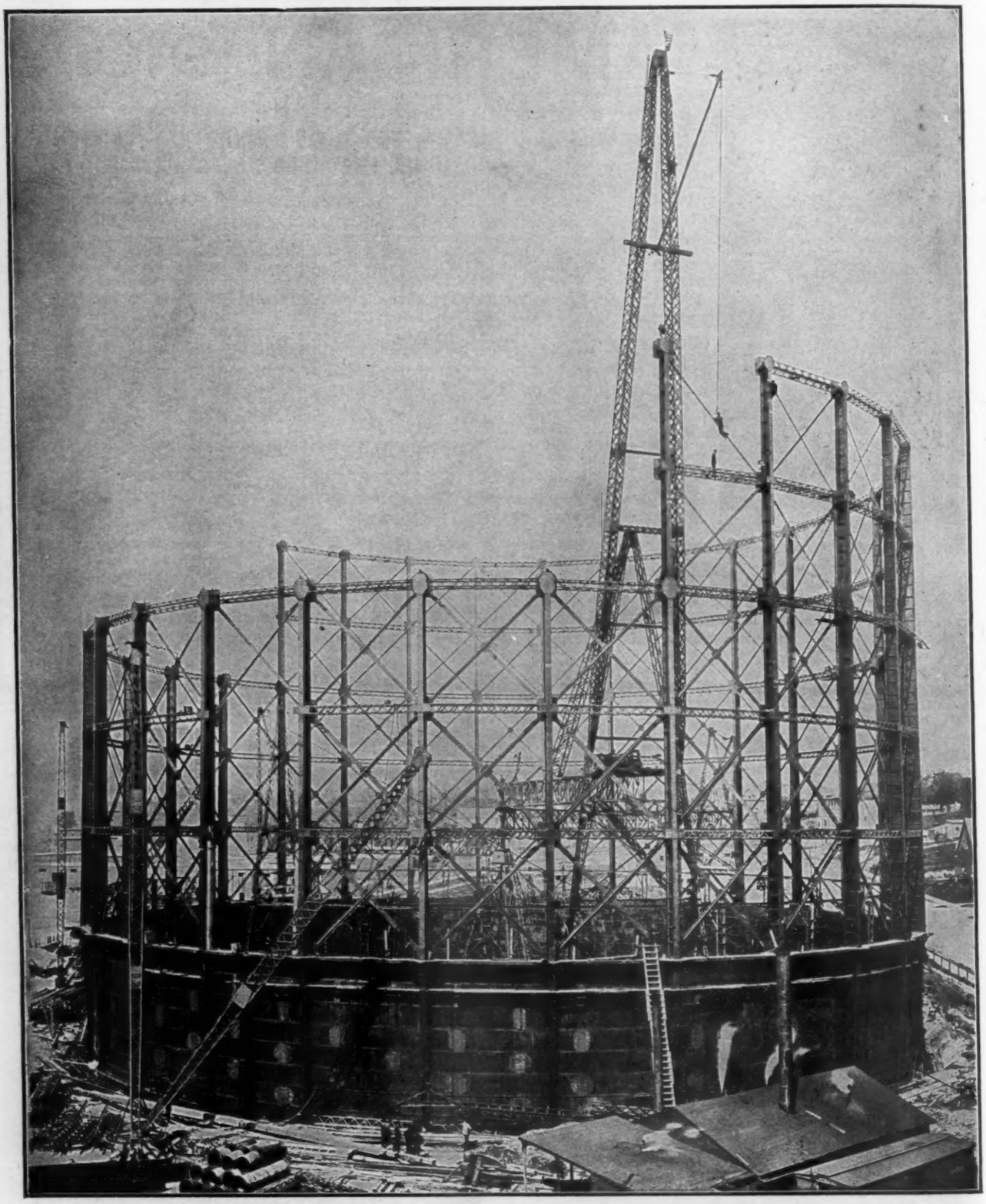
Society of Gas Lighting.—Annual meeting, December, 1910; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 1123 Broadway, New York.

Southern Gas Association.—Annual meeting, April 19-21, 1911, Montgomery, Ala. Officers: President, H. W. Frund, Salisbury, N. C.; Secretary-Treasurer, Jas. Ferrier, Rome, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. May, 1911, ———— Tex. Officers: President, W. B. Tuttle, San Antonio, Tex.; Secretary, H. B. Head, Stephensville, Tex.

Wisconsin Gas Association.—Annual meeting, May ————, 1911, Milwaukee, Wis. Officers: President, W. H. Winslow, Superior, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.

Directory of American Gas Companies, 1909. Price, $5.00. For Sale by A. M. Callender & Co., 42 Pine St., N. Y.



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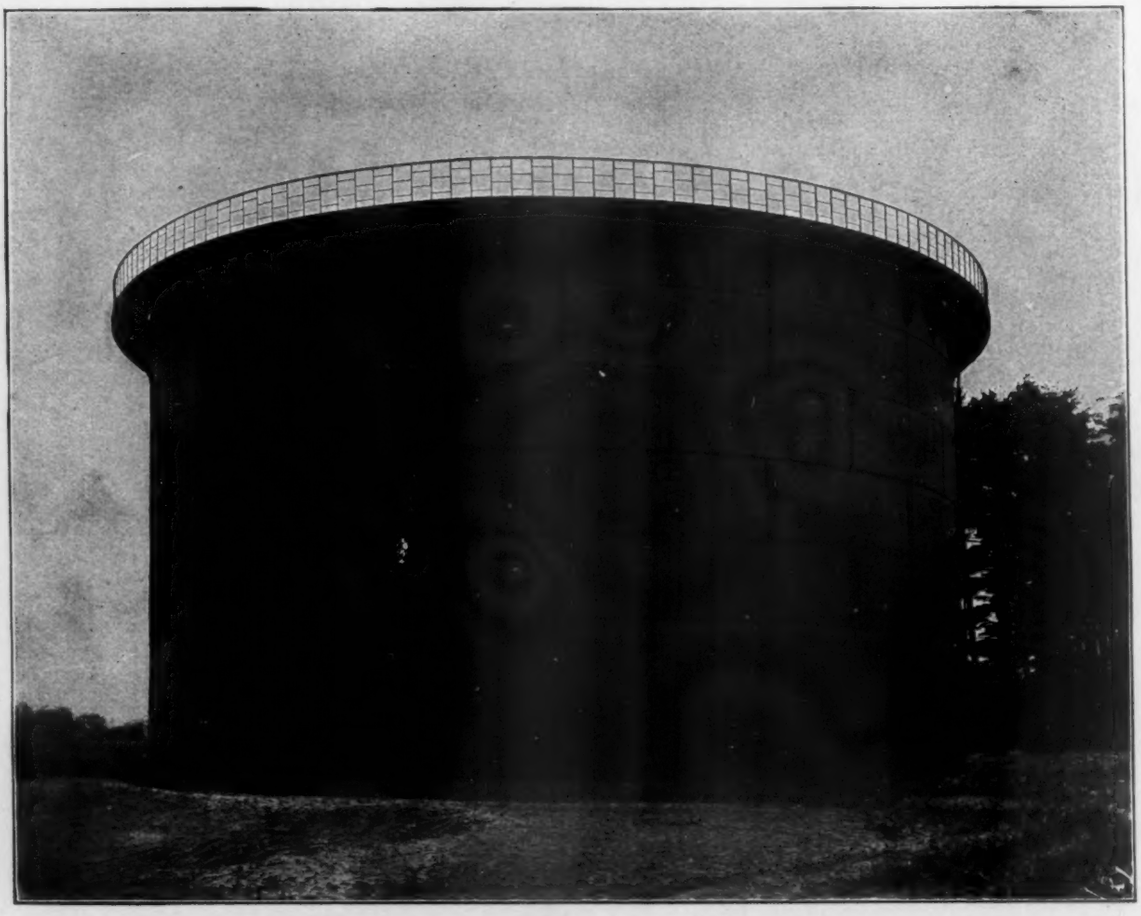

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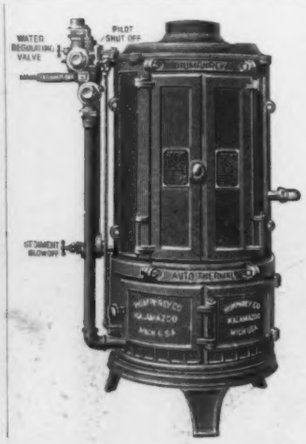

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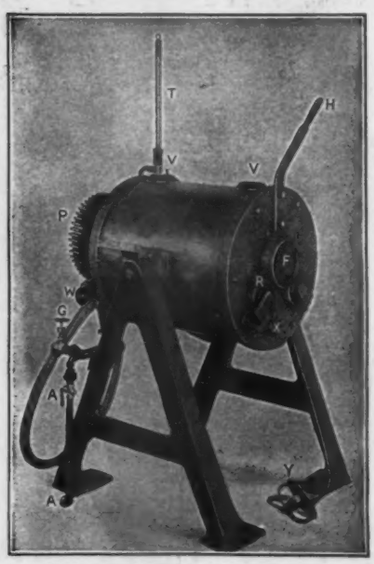

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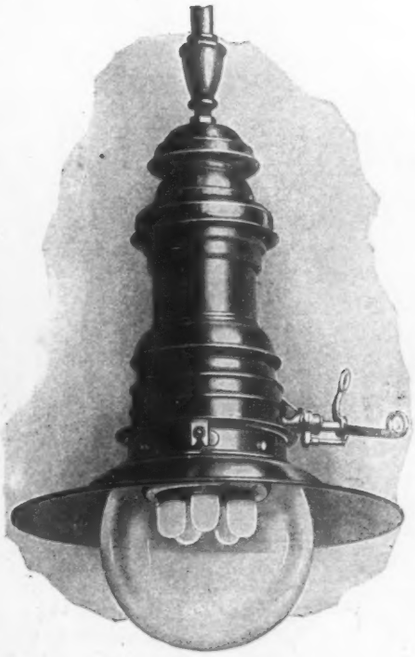

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COLORADO SPRINGS, COL.
CRESTON, IA.
DALTON, GA.
DAYTON, O.
DECATUR, ALA.
DELRAY, MICH.
DETROIT, MICH.
GUADALAJARA, MEXICO.
HENDERSON, KY.
HUNTSVILLE, ALA.
IONIA, MICH.
IOWA CITY, IA.
LA CROSSE, WIS.
LOCKPORT, N. Y.
MARINETTE, WIS.
MARSHALLTOWN, IA.
MENOMINEE, MICH.
MILWAUKEE, WIS.
MT. PLEASANT, MICH.
NORFOLK, VA.
OWOSSO, MICH.
PARIS, KY.
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PHILADELPHIA, PA.
RICH HILL, MO.
RICHMOND, IND.
ROCKFORD, ILLS.
SALT LAKE CITY, UTAH.
SOUTH HAVEN, MICH.
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STURGIS, MICH.
TACOMA, WASH.
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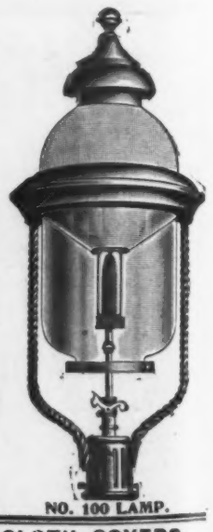

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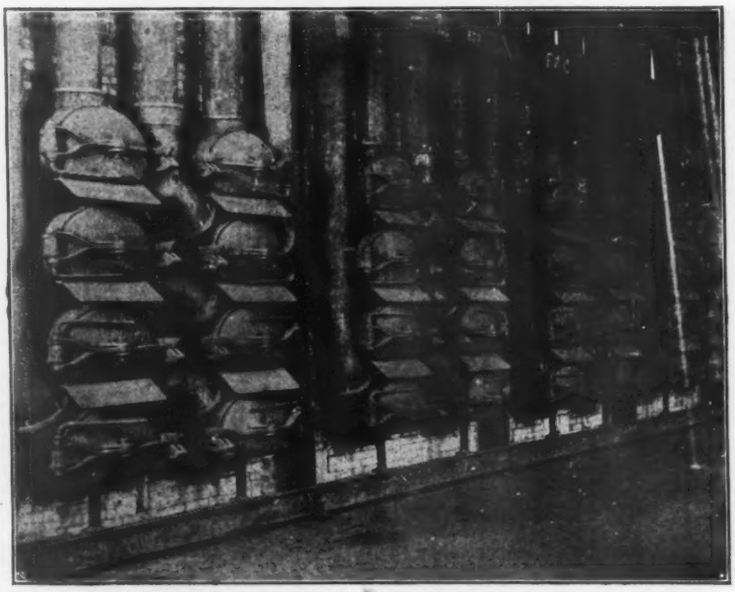

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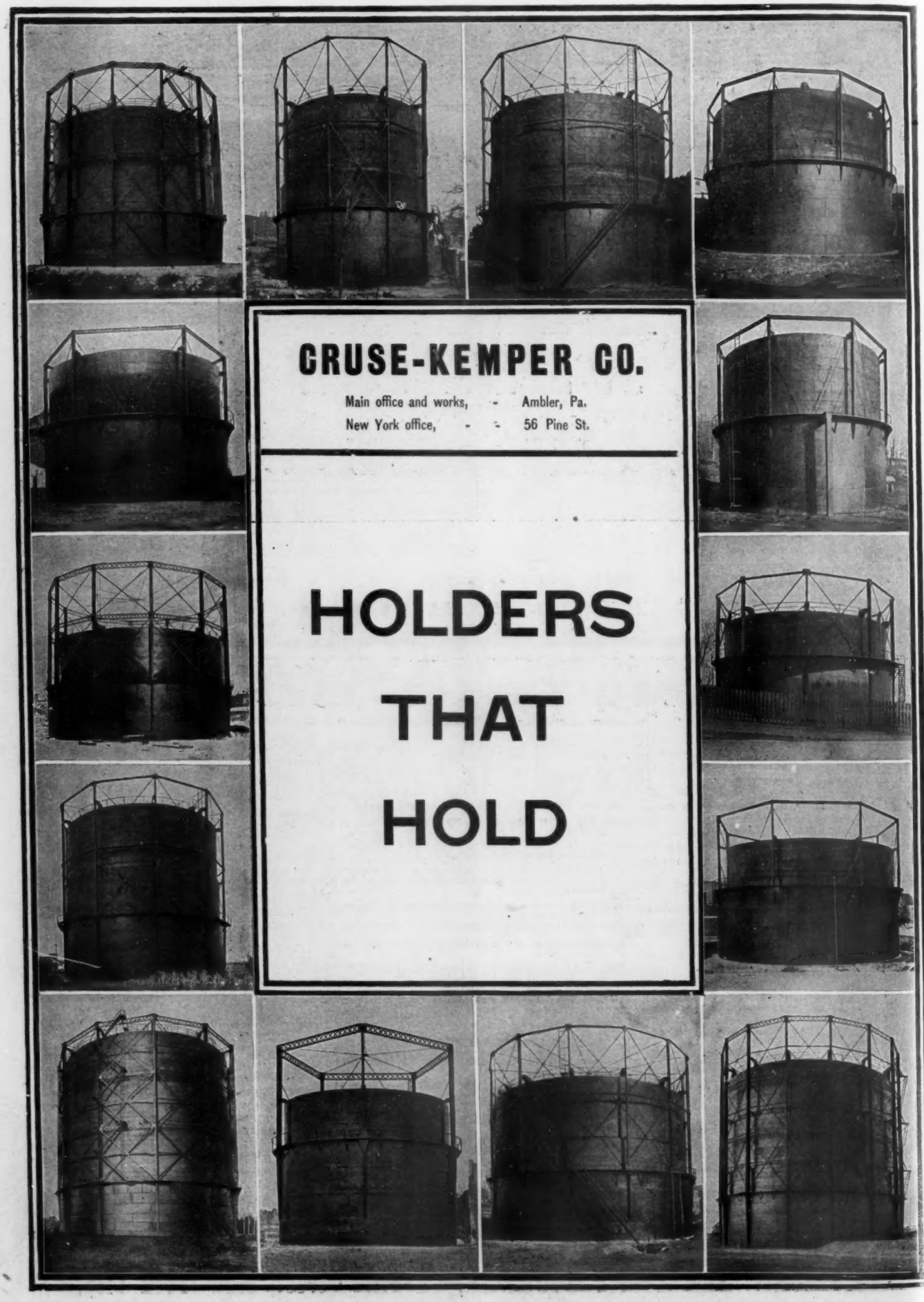
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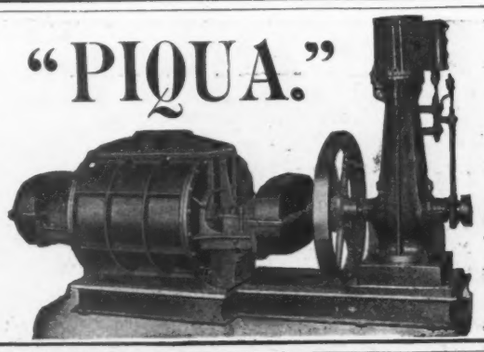

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PUBLIC LIGHTING TABLES FOR SEPTEMBER, 1910.

[Communicated by The American Meter Company.]

Day of Week.	Table No. 1. FOLLOWING THE MOON			Day of Week.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING.		
	Date.	Light.	Extinguish.		Date.	Complete Lighting in 1 Hour.	Complete Extinguishing in 50 Minutes.
						From Time Given.	
		P.M.				P.M.	A.M.
Thu.	1	7.10	4.30 A.M.	Thu.	1	6.27	3.57
Fri.	2	7.10	4.30	Fri.	2	6.27	3.57
Sat.	3	7.10 N.M.	4.30	Sat.	3	6.17	4.07
Sun.	4	7.00	4.30	Sun.	4	6.17	4.07
Mon.	5	7.00	4.30	Mon.	5	6.17	4.07
Tue.	6	7.00	4.30	Tue.	6	6.17	4.07
Wed.	7	7.00	4.30	Wed.	7	6.12	4.07
Thu.	8	7.50	4.30	Thu.	8	6.12	4.07
Fri.	9	8.20	4.30	Fri.	9	6.12	4.07
Sat.	10	8.50	4.30	Sat.	10	6.02	4.17
Sun.	11	9.30 F.Q.	4.40	Sun.	11	6.02	4.17
Mon.	12	10.10	4.40	Mon.	12	6.02	4.17
Tue.	13	11.10	4.40	Tue.	13	6.02	4.17
		A.M.					
Wed.	14	12.10	4.40	Wed.	14	6.02	4.17
Thu.	15	1.20	4.40	Thu.	15	6.02	4.17
Fri.	16	2.30	4.40	Fri.	16	6.02	4.17
Sat.	17	No L.	No L.	Sat.	17	5.52	4.27
Sun.	18	No L. F.M.	No L.	Sun.	18	5.52	4.27
Mon.	19	No L.	No L.	Mon.	19	5.52	4.27
Tue.	20	6.30 P.M.	8.10 P.M.	Tue.	20	5.52	4.27
Wed.	21	6.30	8.40	Wed.	21	5.47	4.27
Thu.	22	6.30	9.10	Thu.	22	5.47	4.27
Fri.	23	6.30	9.50	Fri.	23	5.47	4.27
Sat.	24	6.30	10.30	Sat.	24	5.37	4.37
Sun.	25	6.20 L.Q.	11.30	Sun.	25	5.37	4.37
Mon.	26	6.20	12.30 A.M.	Mon.	26	5.37	4.37
Tue.	27	6.20	1.40	Tue.	27	5.27	4.37
Wed.	28	6.20	2.40	Wed.	28	5.32	4.37
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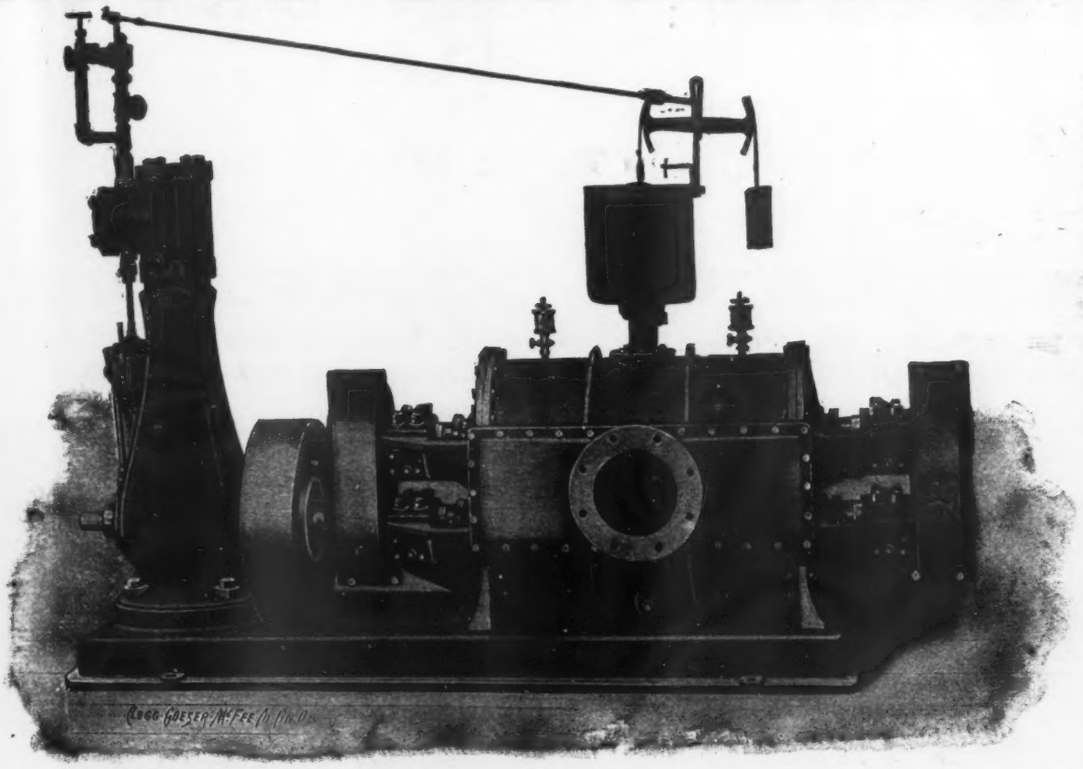

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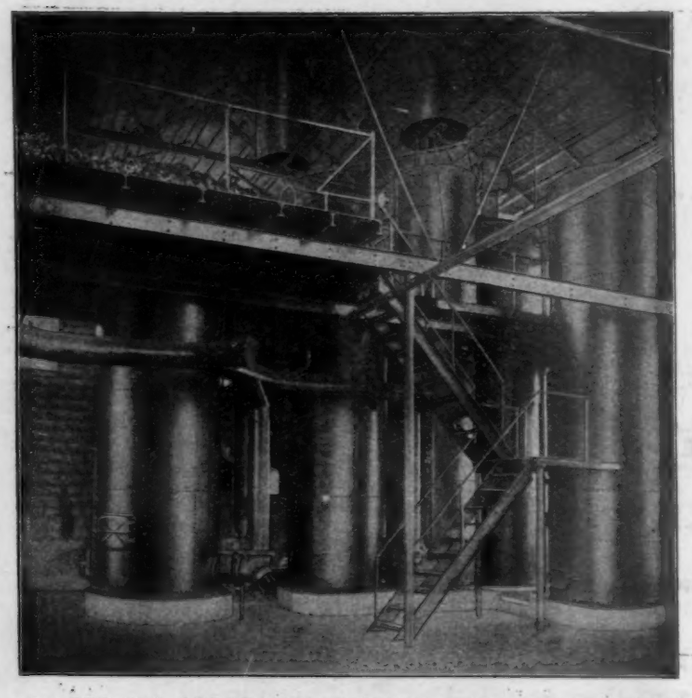

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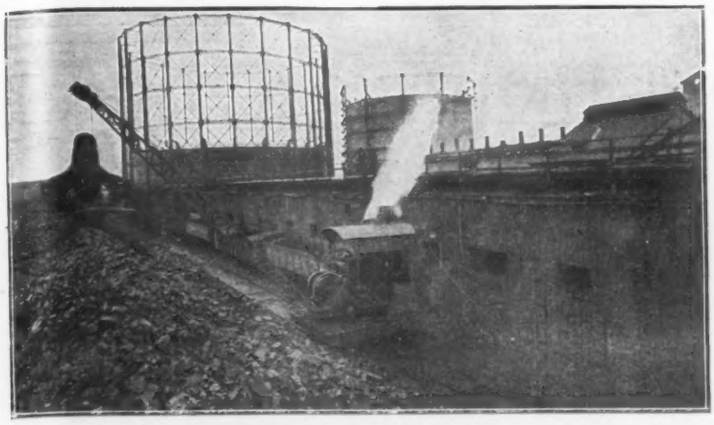

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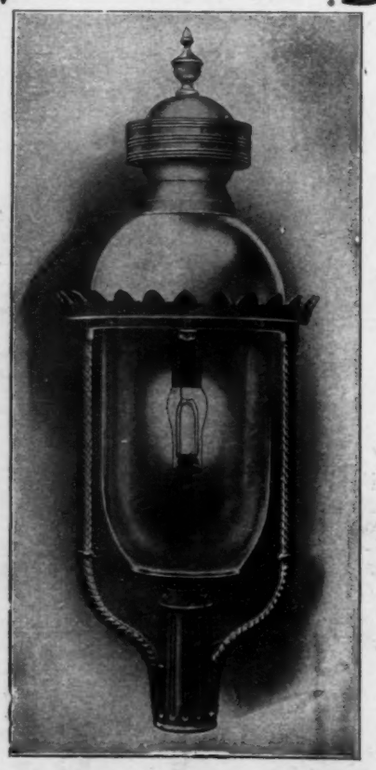

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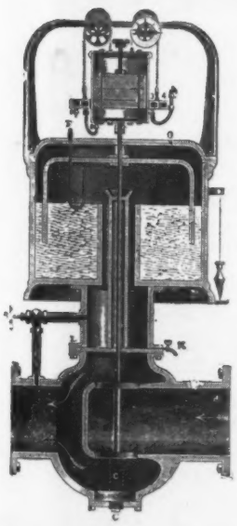

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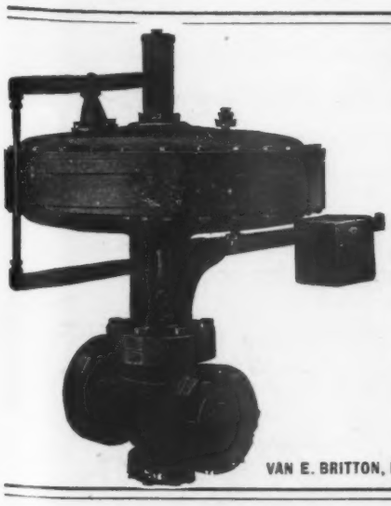

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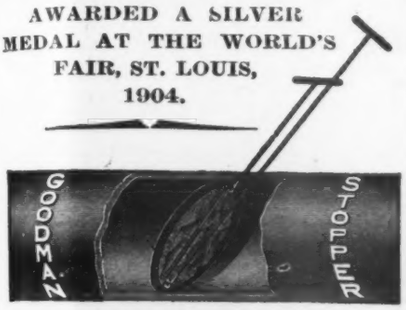

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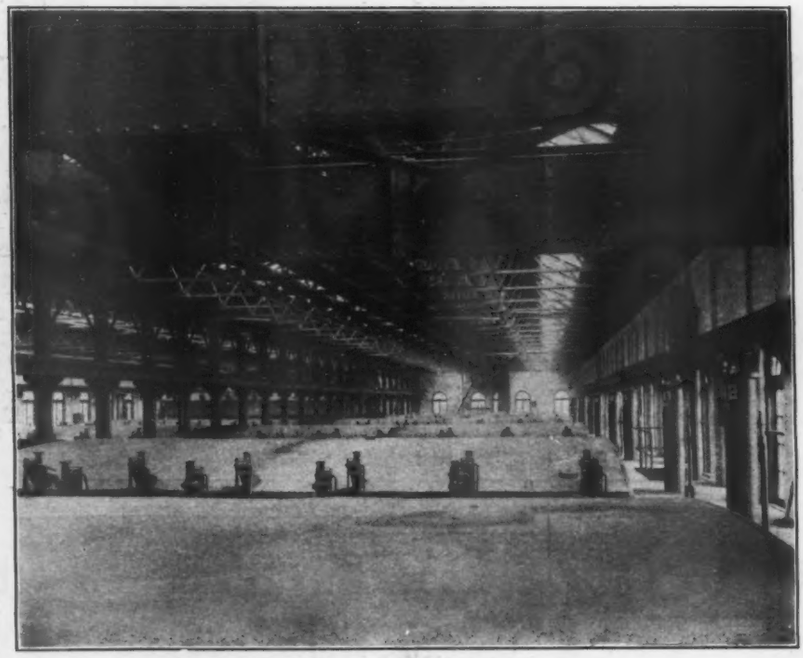

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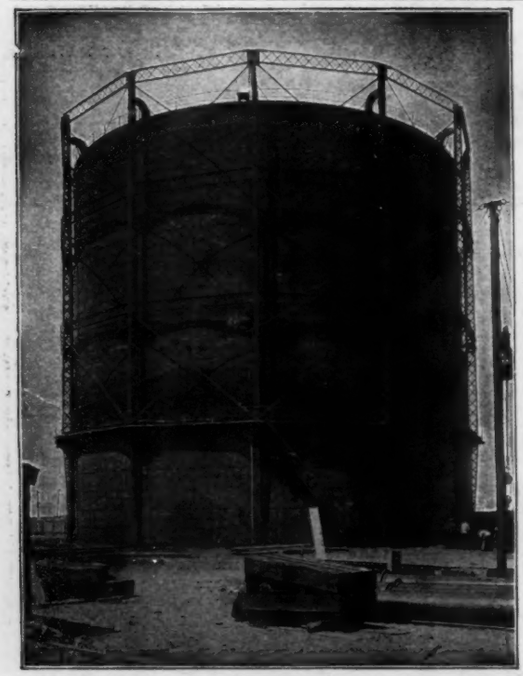

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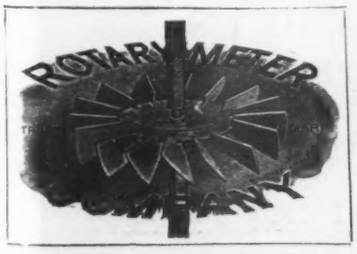

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